



**THE CITY OF WINNIPEG**

# **TENDER**

**TENDER NO. 228-2023**

**FEEDER MAIN VALVE CHAMBER REHABILITATION – VALVE PIT 138 AND 139**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

B1.1 FEEDER MAIN VALVE CHAMBER REHABILITATION – VALVE PIT 138 AND 139

### **B2. SUBMISSION DEADLINE**

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, May 17, 2023.

B2.2 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

### **B3. SITE INVESTIGATION**

B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.

B3.2 The Bidder is advised that project site is located on Lagimodiere Blvd and significant traffic control is required to complete the work. It is recommended that the bidder review the site constraints and specified traffic management requirements.

B3.3 The Bidder/Proponent is responsible for inspecting the Site, the nature of the Work to be done and all conditions that might affect their Bid/Proposal or their performance of the Work, and shall assume all risk for conditions existing or arising in the course of the Work which have been or could have been determined through such inspection.

### **B4. ENQUIRIES**

B4.1 All enquiries shall be directed to the Contract Administrator identified in D6.1.

B4.2 If the Bidder finds errors, discrepancies, or omissions in the Tender, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Tender will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B4.6 Any enquiries concerning submitting through MERX should be addressed to:  
MERX Customer Support  
Phone: 1-800-964-6379  
Email: merx@merx.com

### **B5. CONFIDENTIALITY**

B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

(a) was known to the Bidder before receipt hereof; or

- (b) becomes publicly known other than through the Bidder; or
- (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

## **B6. ADDENDA**

B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Tender, or clarifying the meaning or intent of any provision therein.

B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B6.3 Addenda will be available on the MERX website at [www.merx.com](http://www.merx.com).

B6.4 The Bidder is responsible for ensuring that they have received all addenda and is advised to check the MERX website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid/Proposal. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6.6 Notwithstanding B4, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D6.

## **B7. SUBSTITUTES**

B7.1 The Work is based on the Plant, Materials and methods specified in the Tender.

B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:

- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
- (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
- (c) identify any anticipated cost or time savings that may be associated with the substitute;
- (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
- (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with

the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

- B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in their sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons they wish to inform.
- B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base their Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B18.
- B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

## **B8. BID COMPONENTS**

- B8.1 The Bid shall consist of the following components:
- (a) Form A: Bid/Proposal;
  - (b) Form B: Prices;
  - (c) Form G1: Bid Bond and Agreement to Bond.
- B8.2 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.
- B8.3 The Bid shall be submitted electronically through MERX at [www.merx.com](http://www.merx.com).
- B8.3.1 Bids will **only** be accepted electronically through MERX.
- B8.4 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B18.1(a).

## **B9. BID**

- B9.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.
- B9.2 Paragraph 2 of Form A: Bid/Proposal shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in their own name, their name shall be inserted;
  - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
  - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
  - (d) if the Bidder is carrying on business under a name other than their own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

- B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.
- B9.3 In Paragraph 3 of Form A: Bid/Proposal, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B9.4 Paragraph 13 of Form A: Bid/Proposal shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in their own name, it shall be signed by the Bidder;
  - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
  - (c) if the Bidder is a corporation, it shall be signed by their duly authorized officer or officers;
  - (d) if the Bidder is carrying on business under a name other than their own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B9.4.1 The name and official capacity of all individuals signing Form A: Bid/Proposal should be entered below such signatures.
- B9.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

## **B10. PRICES**

- B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B10.1.1 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D36. Any such costs shall be determined in accordance with D36.
- B10.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B10.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).
- B10.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.
- B10.5.1 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.

## **B11. DISCLOSURE**

- B11.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.
- B11.2 The Persons are:
- (a) N/A

## **B12. CONFLICT OF INTEREST AND GOOD FAITH**

- B12.1** Further to C3.2, Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.
- B12.2** Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:
- (a) other commitments;
  - (b) relationships;
  - (c) financial interests; or
  - (d) involvement in ongoing litigation;
- that could or would be seen to:
- (i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or
  - (ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;
- (e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of their participation in the Tender process or the Work; or
  - (f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.
- B12.3** In connection with their Bid, each entity identified in B12.2 shall:
- (a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;
  - (b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and
  - (c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.
- B12.4** Without limiting B12.3, the City may, in their sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in their sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in their sole discretion, to avoid or mitigate the impact of such Conflict of Interest.
- B12.5** Without limiting B12.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in their sole discretion:
- (a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of their employees proposed for the Work;
  - (b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in their sole discretion, determines cannot be avoided or mitigated;
  - (c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B12.4 to avoid or mitigate a Conflict of Interest; and



- (d) disqualify a Bidder if the Bidder, or one of their employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B12.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in their sole discretion.

### **B13. QUALIFICATION**

B13.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B13.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <https://www.winnipeg.ca/matmgmt/Templates/files/debar.pdf>

B13.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) have successfully carried out work similar in nature, scope and value to the Work; and
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);
- (d) have completed the Accessible Customer Service online training required by the Accessibility for Manitobans Act (AMA) (see B13.6 and D8)
- (e) upon request of the Contract Administrator, provide the Security Clearances in accordance with PART F - Security Clearance.

B13.4 Further to B13.3(a), the Bidder must be able to demonstrate the following specific qualifications in accordance with B13.7:

- (a) a minimum of three (3) examples of successful installations of 600 mm butterfly valves; and,
- (b) a minimum of one (1) successful project example involving construction or modification of valve chambers for large diameter water main ( $\geq 450$  mm) piping.

B13.5 Further to B13.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:
  - (i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

- (ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
  - (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>).
- B13.6 Further to B13.3(d), the Bidder acknowledges they and all Subcontractors have obtained training required by the Accessibility for Manitobans Act (AMA) available at <http://www.accessibilitymb.ca/training.html> for anyone that may have any interaction with the public on behalf of the City of Winnipeg.
- B13.7 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor. The Bidder shall utilize Form L: Contractor Experience or provide similar project sheets containing all information identified in Form L: Contractor Experience.
- B13.8 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.
- B14. BID SECURITY**
- B14.1 The Bidder shall include in their Bid Submission bid security in the form of a digital bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in Form G1: Bid Bond and Agreement to Bond, available on The City of Winnipeg, Corporate Finance, Materials Management Division website at <https://www.winnipeg.ca/MatMgt/templates/files/eBidsecurity.pdf>.
- B14.2 Bid security shall be submitted in a digital format meeting the following criteria:
  - (a) The version submitted by the Bidder must have valid digital signatures and seals;
  - (b) The version submitted by the Bidder must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.
  - (c) The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.
  - (d) The verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.
  - (e) The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding B14.2(a).
- B14.3 Bonds failing the verification process will not be considered to be valid and the bid shall be determined to be non-responsive in accordance with B18.1(a).
- B14.4 Bonds passing the verification process will be treated as original and authentic.
- B14.4.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.
- B14.5 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly

formed with the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

- B14.6 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Tender.

#### **B15. OPENING OF BIDS AND RELEASE OF INFORMATION**

- B15.1 Bids will not be opened publicly.
- B15.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated and pending review and verification of conformance with requirements) will be available on the MERX website at [www.merx.com](http://www.merx.com).
- B15.3 After award of Contract, the name(s) of the successful Bidder(s) and their Contract amount(s) will be available on the MERX website at [www.merx.com](http://www.merx.com).
- B15.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).
- B15.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

#### **B16. IRREVOCABLE BID**

- B16.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid/Proposal.
- B16.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly formed and the contract securities have been furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid/Proposal.

#### **B17. WITHDRAWAL OF BIDS**

- B17.1 A Bidder may withdraw their Bid without penalty at any time prior to the Submission Deadline.

#### **B18. EVALUATION OF BIDS**

- B18.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Tender, or acceptable deviation there from (pass/fail);
  - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B13 (pass/fail);
  - (c) Total Bid Price;
  - (d) economic analysis of any approved alternative pursuant to B7.
- B18.2 Further to B18.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

- B18.3 Further to B18.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in their Bid or in other information required to be submitted, that they are qualified.
- B18.4 Further to B18.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.
- B18.4.1 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.
- B18.4.2 Further to B18.1(a), in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

## **B19. AWARD OF CONTRACT**

- B19.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B19.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be qualified, and the Bids are determined to be responsive.
- B19.2.1 Without limiting the generality of B19.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
  - (b) the prices are materially in excess of the prices received for similar work in the past;
  - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with their own forces;
  - (d) only one Bid is received; or
  - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B19.3 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D36 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.
- B19.4 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B18.
- B19.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of their Bid upon written request to the Contract Administrator.

## PART C - GENERAL CONDITIONS

### C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2020-01-31) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at [http://www.winnipeg.ca/matmgt/gen\\_cond.stm](http://www.winnipeg.ca/matmgt/gen_cond.stm)
- C0.2 A reference in the Tender to a section, clause or subclause with the prefix “C” designates a section, clause or subclause in the *General Conditions for Construction*.

## PART D - SUPPLEMENTAL CONDITIONS

### GENERAL

#### D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for Construction*, these Supplemental Conditions are applicable to the Work of the Contract.

#### D2. FORM OF CONTRACT DOCUMENTS

D2.1 Notwithstanding C4.1(c) and C4.4, the Contract Documents will be provided to the Contractor electronically and there will be no requirement for execution and return to the City by the Contractor. Accordingly, the provisions under C4.4(a) and C4.4(b) are no longer applicable.

#### D3. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall consist of the rehabilitation of two feeder main valve chambers, including valve replacements and structural repairs.

D3.2 The major components of the Work are as follows:

- (a) traffic control;
- (b) excavation of the existing chambers and removal of roof slab(s);
- (c) removal and salvage existing feeder piping components;
- (d) installation of new feeder main piping components;
- (e) preparation and painting of exposed steel components;
- (f) chamber structural repairs;
- (g) sealing, insulating, and backfill of the chambers; and,
- (h) restoration.

D3.3 The following shall apply to the Work:

- (a) City of Winnipeg Green Building Policy: New City-Owned Buildings and major additions;  
<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=5989>
- (b) Universal Design Policy  
<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=3604>

#### D4. SITE INVESTIGATION DUE DILIGENCE AND RISK

D4.1 Notwithstanding C3.1, the Contractor acknowledges that the site investigation reports and other site information included in this Tender have been provided to it and may be relied upon by the Contractor to the extent that the Contractor uses Good Industry Practice in interpreting such report(s) and site information and carries out the Work in accordance with Good Industry Practice based upon such report(s) and the information contained in them and such other site information. In the event that a site condition related to:

- (a) the location of any utility which can be determined from the records or other information available at the offices of any public authority or person, including a municipal corporation and any board or commission thereof, having jurisdiction or control over the utility;
- (b) the Site conditions, including but not limited to subsurface hazardous materials or other concealed physical conditions;
- (c) the location, nature, quality or quantity of the materials to be removed or to be employed in the performance of the Work;

- (d) the nature, quality or quantity of the Plant needed to perform the Work;
- (e) all matters concerning access to the Site, power supplies, location of existing services, utilities or materials necessary for the completion of the Work; and
- (f) all other matters which could in any way affect the performance of the Work;

that could not have been “properly inferable”, “readily apparent” and readily discoverable” using Good Industry Practice by the Contractor, results in additional Work which is a direct result of this newly discovered site condition, such additional Work will be considered by the City under Changes in Work.

## **D5. DEFINITIONS**

D5.1 When used in this Tender:

- (a) “**ANSI**” means American National Standards Institute;
- (b) “**ASTM**” means American Society for Testing and Materials;
- (c) “**ASME**” means American Society of Mechanical Engineers;
- (d) “**AWWA**” means American Water Works Association;
- (e) “**CSA**” means Canadian Standards Association;
- (f) “**NACE**” means National Association of Corrosion Engineers; and,
- (g) “**SSPC**” means Society for Protective Coatings.

## **D6. CONTRACT ADMINISTRATOR**

D6.1 The Contract Administrator is Morrison Hershfield Ltd., represented by:  
Nathan Kehler, P.Eng.  
Municipal Engineer

Telephone No. 204-226-1008  
Email Address nkehler@morrisonhershfield.com

D6.2 At the pre-construction meeting, Mr. Kehler will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

## **D7. CONTRACTOR'S SUPERVISOR**

D7.1 At the pre-construction meeting, the Contractor shall identify their designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

## **D8. ACCESSIBLE CUSTOMER SERVICE REQUIREMENTS**

D8.1 The Accessibility for Manitobans Act (AMA) imposes obligations on The City of Winnipeg to provide accessible customer service to all persons in accordance with the Customer Service Standard Regulation (“CSSR”) to ensure inclusive access and participation for all people who live, work or visit Winnipeg regardless of their abilities.

D8.1.1 The Contractor agrees to comply with the accessible customer service obligations under the CSSR and further agrees that when providing the Goods or Services or otherwise acting on the City of Winnipeg's behalf, shall comply with all obligations under the AMA applicable to public sector bodies.

D8.1.2 The accessible customer service obligations include, but are not limited to:

- (a) providing barrier-free access to goods and services;
- (b) providing reasonable accommodations;

- (c) reasonably accommodating assistive devices, support persons, and support animals;
- (d) providing accessibility features e.g. ramps, wide aisles, accessible washrooms, power doors and elevators;
- (e) inform the public when accessibility features are not available;
- (f) providing a mechanism or process for receiving and responding to public feedback on the accessibility of all goods and services; and
- (g) providing adequate training of staff and documentation of same.

## **D9. UNFAIR LABOUR PRACTICES**

- D9.1 Further to C3.2, the Contractor declares that in bidding for the Work and in entering into this Contract, the Contractor and any proposed Subcontractor(s) conduct their respective business in accordance with established international codes embodied in United Nations Universal Declaration of Human Rights (UDHR) <https://www.un.org/en/about-us/universal-declaration-of-human-rights> International Labour Organization (ILO) [https://www.ilo.org/global/lang--en/index.htm](https://www.ilo.org/global/lang-en/index.htm) conventions as ratified by Canada.
- D9.2 The City of Winnipeg is committed and requires its Contractors and their Subcontractors, to be committed to upholding and promoting international human and labour rights, including fundamental principles and rights at work covered by ILO eight (8) fundamental conventions and the United Nations Universal Declaration of Human Rights which includes child and forced labour.
- D9.3 Upon request from the Contract Administrator, the Contractor shall provide disclosure of the sources (by company and country) of the raw materials used in the Work and a description of the manufacturing environment or processes (labour unions, minimum wages, safety, etc.).
- D9.4 Failure to provide the evidence required under D9.3, may be determined to be an event of default in accordance with C18.
- D9.5 In the event that the City, in its sole discretion, determines the Contractor to have violated the requirements of this section, it will be considered a fundamental breach of the Contract and the Contractor shall pay to the City a sum specified by the Contract Administrator in writing (“Unfair Labour Practice Penalty”). Such a violation shall also be considered an Event of Default, and shall entitle the City to pursue all other remedies it is entitled to in connection with same pursuant to the Contract.
- D9.5.1 The Unfair Labour Practice Penalty shall be such a sum as determined appropriate by the City, having due regard to the gravity of the Contractor’s violation of the above requirements, any cost of obtaining replacement goods/ services or rectification of the breach, and the impact upon the City’s reputation in the eyes of the public as a result of same.
- D9.5.2 The Contractor shall pay the Unfair Labour Practice Penalty to the City within thirty (30) Calendar Days of receiving a demand for same in accordance with clause D9.5. The City may also hold back the amount of the Unfair Labour Practice Penalty from payment for any amount it owes the Contractor.
- D9.5.3 The obligations and rights conveyed by this clause survive the expiry or termination of this Contract, and may be exercised by the City following the performance of the Work, should the City determine, that a violation by the Contractor of the above clauses has occurred following same. In no instance shall the Unfair Labour Practice Penalty exceed the total of twice the Contract value.

## **D10. FURNISHING OF DOCUMENTS**

- D10.1 Upon award of the Contract, the Contractor will be provided with ‘issued for construction’ Contract Documents electronically, including Drawings in PDF format only.



## **SUBMISSIONS**

### **D11. AUTHORITY TO CARRY ON BUSINESS**

D11.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

### **D12. SAFE WORK PLAN**

D12.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D12.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Safety/default.stm>

D12.3 Notwithstanding B13.4 at any time during the term of the Contract, the City may, at their sole discretion and acting reasonably, require an updated COR Certificate or Annual Letter of good Standing. A Contractor, who fails to provide a satisfactory COR Certificate or Annual Letter of good Standing, will not be permitted to continue to perform any Work.

### **D13. INSURANCE**

D13.1 The Contractor shall provide and maintain the following insurance coverage:

- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
- (b) if applicable, Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence.
- (c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.

D13.2 Deductibles shall be borne by the Contractor.

D13.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, as applicable.

D13.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

### **D14. CONTRACT SECURITY**

D14.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond until the expiration of the warranty period in the form of:

- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; and
- (b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D14.1.1 Where the contract security is a performance bond, it may be submitted in hard copy or digital format. If submitted in digital format the contract security must meet the following criteria:

- (a) the version submitted by the Contractor must have valid digital signatures and seals;
- (b) the version submitted by the Contractor must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.
- (c) the version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.
- (d) the verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.
- (e) the results of the verification must provide a clear, immediate and printable indication of pass or fail regarding D14.1(b).

D14.1.2 Digital bonds failing the verification process will not be considered to be valid and may be determined to be an event of default in accordance with C18.1. If a digital bond fails the verification process, the Contractor may provide a replacement bond (in hard copy or digital format) within seven (7) Calendar Days of the City's request or within such greater period of time as the City in their discretion, exercised reasonably, allows.

D14.1.3 Digital bonds passing the verification process will be treated as original and authentic.

D14.2 The Contractor shall provide the Contract Administrator identified in D6 with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of an award letter and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D14.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

- (a) give the Subcontractor written notice of the existence of the labour and material payment bond in D14.1(b); and
- (b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

## **D15. SUBCONTRACTOR LIST**

D15.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract Documents, if applicable.

## **D16. EQUIPMENT LIST**

D16.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment List) at least two (2) Business

Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

#### **D17. DETAILED WORK SCHEDULE**

D17.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents if applicable.

D17.2 The detailed work schedule shall consist of the following:

(a) A Gantt chart for the work

All acceptable to the Contract Administrator

D17.3 Further to D17.2(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

#### **D18. REQUIREMENTS FOR SITE ACCESSIBILITY PLAN**

D18.1 The Contractor shall provide the Contract Administrator with an Accessibility Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D18.2 The Accessibility Plan shall demonstrate how the Contractor will accommodate the safe passage of pedestrians and cyclists in accordance with the Manual of Temporary Traffic Control, the Contract Drawings, Staging Plans, and Streets By-Law No. 1481/77 at all times for the duration of the Construction. Unless noted in the Contract, the Accessibility Plan must include a written plan for the following:

(a) How the Contractor will maintain at least one crossing in each direction for each intersection (one north/south crosswalk and one east/west crosswalk).

(b) How the Contractor will maintain access to bus stops within the site.

(c) How the Contractor will maintain access to pedestrian corridors and half signals.

(d) How the Contractor will maintain cycling facilities.

(e) How the Contractor will maintain access to residents and businesses unless otherwise noted in the Contract.

(f) Any required detour signage at adjacent crossings to facilitate sidewalk or active transportation pathway closures.

D18.3 The Accessibility Plan may also include figures, sketches, or drawings to demonstrate the proposed plan.

D18.4 The Accessibility Plan shall include written details on how the Contractor intends to review, maintain, and document all items related to the Accessibility Plan on-site during Construction, including, but not limited to:

(a) Signage

(b) Temporary Ramping

(c) Transit Stops

(d) Detour Signage

D18.5 At minimum, the Contractor shall review the site conditions on a daily basis to ensure that all features related to the Accessibility Plan are in place. The site review is intended to correct deficiencies as a result of unforeseen events such as wind, traffic, or the general public. Deficiencies that are direct result of the Contractors actions must be corrected immediately.

D18.6 Any changes to the Accessibility Plan must be approved by the Contract Administrator.

- D18.7 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.
- D18.8 Deficiencies as a direct result of actions by the Contractor that are not immediately corrected and/or failure to produce records that demonstrate that the site was maintained in compliance with the Accessibility Plan may result in a pay adjustment via the monthly Progress Payment. The rate of pay adjustment will be as per the following schedule:
- (a) First Offence – A warning will be issued and documented in the weekly or bi-weekly site meeting.
  - (b) Second Offence – A field instruction to immediately correct the site will be issued by the Contract Administrator.
- D18.9 Third and subsequent Offences – A pay reduction will be issued in the amount of \$250.00 per instance and per day.

## **SCHEDULE OF WORK**

### **D19. COMMENCEMENT**

- D19.1 The Contractor shall not commence any Work until they are in receipt of an award letter from the Award Authority authorizing the commencement of the Work.
- D19.2 The Contractor shall not commence any Work on the Site until:
- (a) the Contract Administrator has confirmed receipt and approval of:
    - (i) evidence of authority to carry on business specified in D11;
    - (ii) evidence of the workers compensation coverage specified in C6.15;
    - (iii) the Safe Work Plan specified in D12;
    - (iv) evidence of the insurance specified in D13;
    - (v) the contract security specified in D14;
    - (vi) the Subcontractor list specified in D15;
    - (vii) the equipment list specified in D16;
    - (viii) the detailed work schedule specified in D17;
    - (ix) the Requirements for Site Accessibility Plan specified in D18; and
    - (x) the direct deposit application form specified in D32.
  - (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.
- D19.3 The City intends to award this Contract by June 29, 2023.
- D19.3.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

### **D20. WORK BY OTHERS**

- D20.1 Further to C6.25, the Contractor's attention is directed to the fact that other Contractors, the personnel of Utilities and the staff of the City may be working within the project limit, approach roadway, adjacent roadways or right-of-way. The activities of these agencies may coincide with the Contractors execution of Work and it will be the Contractor's responsibility to cooperate to the fullest extent with other personnel working in the area, and such cooperation is an obligation of the Contractor under the terms of Contract.
- D20.2 Work by others on or near the Site will include but not necessarily be limited to:
- (a) 2023 Pavement Renewals – Dakota and Lagimodiere (Tender 207-2023) – Includes rehabilitation of Northbound Lagimodiere Blvd from Fermor Ave to Cottonwood Ave.

D20.2.1 Further to D20.1 the Contractor shall cooperate and coordinate all activities with all parties performing required Work by Others identified in D20.1 and accommodate the necessary area on Site required for the Work by Others to complete the Work

## **D21. WORKING DAYS**

D21.1 Further to C1.1(tt), the Contract Administrator's determination of whether or not atmospheric and Site conditions are such that a Working Day is deemed to have elapsed may be based at one time on one type of work while at another time a Working Day may be based on another type of work. When more than one type of major work is involved, the quantity of equipment that must be able to work in order to meet the requirements of a Working Day may vary considerably from that specified in the General Conditions.

D21.2 In the event that incidental work is behind schedule which, in the opinion of the Contract Administrator, should have been or could have been carried out by the Contractor in conjunction with or immediately following work of a major type, the City hereby reserves the right to charge Working Days on the incidental work until such time as it is up to schedule.

D21.3 When the major type of work involves restoration of the site to the condition it was prior to rainfall, Working Days shall not be charged.

D21.4 The Contract Administrator will furnish the Contractor with a daily record for each major type of work showing various information concerning the equipment, the time it worked, could have worked and Working Days charged. This report is to be signed each day by an authorized representative of the Contractor.

D21.5 Notwithstanding C1.1(tt), if the Contractor chooses to work on a Saturday, Sunday, or statutory or civic holiday and is able to complete at least seven (7) hours of work during the period between 7:00 a.m. Winnipeg time or the time the Contractor's operations normally commence, whichever is earlier, and 7:00 p.m. Winnipeg time the day shall be considered a Working Day.

D21.6 Working Days shall be incurred by the Contractor for every Working Day as defined herein. Working days shall be incurred starting on the date the Contractor commences work on site, or the date of commencement identified on the Contractors submitted schedule (D17), whichever occurs first.

D21.7 Planned Breaks in Construction

- (a) The Contractor will be permitted planned suspensions of on-site construction to facilitate the nature of the work and seasonal weather breaks where contract work is not completed. Working Days will not be incurred during these periods.
- (b) All planned breaks in on-site construction activity must be clearly identified in the Contractors detailed construction schedule (D17) and notice must be provided in writing a minimum of two (2) Business Days prior to the planned suspension of work. Failure of the Contractor to provide adequate notice, in the opinion of the Contract Administrator, may result in Working Days being incurred.
- (c) During these periods, the Site must be made secure, roadways completely operational, and all existing facilities and work in progress be protected from weather or other potentially harmful effects.
- (d) Upon recommencement of site activities after long breaks (greater than 1 month), the Contractor shall provide an updated schedule and notification to the Contract Administrator a minimum of five (5) Business Days prior to recommencement of work.
- (e) No changes to the Contract completion dates resulting from suspension of contract time as described herein will be considered.

## **D22. SCHEDULE RESTRICTIONS**

D22.1 Feeder Main Shutdowns

- D22.1.1 Feeder main shutdowns will be scheduled based on a number of factors including routine maintenance and repair work, water demand, weather and other factors. The City shall endeavour to make the specified time periods available to the Contractor to schedule his Work requiring isolation and draining of various feeder mains, without limiting the City's control over the operation of the regional water system to complete other work, maintain adequate system service and maintain the integrity of the infrastructure. The City shall reserve the right to cancel and/or delay these schedule dates at any time, due to any circumstances that could adversely affect water supply system operation, including but not limited to high water demand, abnormal weather, failures of related water system components and/or security concerns.
- D22.1.2 The feeder main shutdown will only be permitted between September 1<sup>st</sup> (September Long Weekend) and May 17<sup>th</sup> (May Long Weekend) of a given year.
- D22.1.3 The two feeder mains shall be handed over to the City ready for return to service within thirty-five (35) Calendar Days of shutdown and hand over to the Contractor for commencement of the work. Calendar Days will be counted starting the next Calendar Day after isolation by City forces and notification for the Contractor to commence draining and work. The identified time frame does not include time associated with health testing, which will be completed after filling of the line by City forces.

**D23. CRITICAL STAGES**

- D23.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:
- (a) Feeder Main Shutdown - Shutdown for Replacement of the 600 mm butterfly valves shall be completed within thirty-five (35) Calendar Days as measured in D22.1.

**D24. SUBSTANTIAL PERFORMANCE**

- D24.1 The Contractor shall achieve Substantial Performance within forty (40) consecutive Working Days of the commencement of the Work as specified in D19, or by May 17, 2024, whichever comes first.
- D24.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.
- D24.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

**D25. TOTAL PERFORMANCE**

- D25.1 The Contractor shall achieve Total Performance within fifty (50) consecutive Working Days of the commencement of the Work as specified in D19, or by June 28, 2024, whichever comes first.
- D25.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.
- D25.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

## **D26. LIQUIDATED DAMAGES**

- D26.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:
- (a) Substantial Performance - Two thousand dollars (\$2,000);
  - (b) Total Performance – One thousand dollars (\$1,000).
- D26.2 If the Contractor fails to achieve Critical Stages in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Calendar Day for each and every Calendar Day following the days fixed herein for same during which such failure continues:
- (a) Critical Stage – Feeder Main Shutdown – Five hundred dollars (\$500);
- D26.3 The amounts specified for liquidated damages in D26.1 and D26.2 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve, Critical Stages, Substantial Performance or Total Performance by the days fixed herein for same.
- D26.4 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

## **D27. COVID-19 SCHEDULE DELAYS**

- D27.1 The City acknowledges that the schedule for this Contract may be impacted by the COVID-19 pandemic. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the health and safety of workers and the public, directives from health authorities and various levels of government and in close consultation with the Contract Administrator.
- D27.2 If the Contractor is delayed in the performance of the Work by reason of the COVID-19 pandemic, the Work schedule may be adjusted by a period of time equal to the time lost due to such delay and costs related to such delay will be determined as identified herein.
- D27.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether COVID-19 will affect the start date. The Contractor shall provide sufficient evidence that the delay is directly related to COVID-19, including but not limited to evidence related to availability of staff, availability of Material or work by others.
- D27.4 For any delay related to COVID-19 and identified after Work has commenced, the Contractor shall within seven (7) Calendar Days of becoming aware of the anticipated delay declare the additional delay and shall provide sufficient evidence as indicated in D27.3. Failure to provide this notice will result in no additional time delays being considered by the City.
- D27.5 The Work schedule, including the durations identified in D21 to D25 where applicable, will be adjusted to reflect delays accepted by the Contract Administrator. No additional payment will be made for adjustment of schedules except where seasonal work, not previously identified in the Contract, is carried over to the following construction season.
- D27.6 Where Work not previously identified is being carried over solely as a result of delays related to COVID-19, as confirmed by the Contract Administrator, the cost of temporary works to maintain the Work in a safe manner until Work recommences, will be considered by the Contract Administrator. Where the Work is carried over only partially due to COVID-19, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.
- D27.7 Any time or cost implications as a result of COVID-19 and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

## **D28. SCHEDULED MAINTENANCE**

- D28.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Landscaping as specified in CW3510.
- D28.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

## **CONTROL OF WORK**

### **D29. JOB MEETINGS**

- D29.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.
- D29.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever they deem it necessary.

### **D30. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

- D30.1 Further to C6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

### **D31. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS**

- D31.1 Further to B13.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at their sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.4.

## **MEASUREMENT AND PAYMENT**

### **D32. PAYMENT**

- D32.1 Further to C12, the City shall make payments to the Contractor by direct deposit to the Contractor's banking institution, and by no other means. Payments will not be made until the Contractor has made satisfactory direct deposit arrangements with the City. Direct deposit application forms are at [https://winnipeg.ca/finance/files/Direct\\_Deposit\\_Form.pdf](https://winnipeg.ca/finance/files/Direct_Deposit_Form.pdf).

### **D33. FUEL PRICE ADJUSTMENT**

- D33.1 The Contract is subject to a fuel price adjustment which will be calculated monthly based on eligible Work completed utilizing the following mathematical formulas;
- (a) where the price of fuel has increased -  $((CFI/BFI)-1.15) \times Q \times FF$ ; and
  - (b) where the price of fuel has decreased -  $((CFI/BFI)-0.85) \times Q \times FF$ ; where
    - (i) BFI = base fuel index



- (ii) CFI = current fuel index
- (iii) FF = fuel factor
- (iv) Q = monetary value of Work applied in the calculation.

- D33.1.1 Eligible Work will be determined in accordance with D33.5.
- D33.1.2 The base fuel index (BFI) will be the retail price of fuel identified on the Submission Deadline based on latest published “Monthly average retail prices for gasoline and fuel by geography” for Winnipeg, published by [Statistics Canada, Table 18-10-0001-01](#). The BFI is a blended rate based on 15% regular unleaded gasoline at self-service filling stations and 85% diesel fuel at self-service filling stations.
- D33.1.3 The current fuel index (CFI) based on the above blended rate will be determined for each monthly progress estimate and applied on the following progress estimate as a change order once rates are published by Statistics Canada.
- D33.1.4 A Fuel Factor (FF) rate of the monetary value of all eligible Work completed that month based on the Contract unit prices will be used to calculate the assumed apportioned cost of fuel.
- D33.2 Fuel cost adjustments may result in additional payment to the Contractor or credit to the City within the Contract by way of a monthly change order.
- D33.3 The fuel escalation or de-escalation adjustment will not be applied if the CFI is within  $\pm 15\%$  of the BFI.
- D33.4 Fuel escalation adjustments will not be considered beyond the Substantial Performance/Critical Stages except where those dates/Working Days are adjusted by change order. Fuel de-escalation adjustments will apply for Work that extends beyond the dates/Working Days specified for Substantial Performance/Critical Stages.
- D33.5 The Fuel Factor (FF) rates will be set as follows:
- (a) The Fuel Factor rate will be set at 1.2% of the monetary value for all Work identified on Form B: Prices related to Water and Waste Work.

## **WARRANTY**

### **D34. WARRANTY**

- D34.1 Warranty is as stated in C13.

## **DISPUTE RESOLUTION**

### **D35. DISPUTE RESOLUTION**

- D35.1 If the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator, the Contractor shall act in accordance with the Contract Administrator’s opinion, determination, or decision unless and until same is modified by the process followed by the parties pursuant to D35.
- D35.2 The entire text of C21.4 is deleted, and amended to read: “Intentionally Deleted”
- D35.3 The entire text of C21.5 is deleted, and amended to read:
- (a) If Legal Services has determined that the Disputed Matter may proceed in the Appeal Process, the Contractor must, within ten (10) Business Days of the date of the Legal Services Response Letter, submit their written Appeal Form, in the manner and format set out on the City’s Materials Management Website, to the Chief Administrative Officer, and to the Contract Administrator. The Contractor may not raise any other disputes other than the Disputed Matter in their Appeal Form.

- D35.4 Further to C21, prior to the Contract Administrator's issuance of a Final Determination, the following informal dispute resolution process shall be followed where the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator ("Dispute"):
- (a) In the event of a Dispute, attempts shall be made by the Contract Administrator and the Contractor's equivalent representative to resolve Disputes within the normal course of project dealings between the Contract Administrator and the Contractor's equivalent representative.
  - (b) Disputes which in the reasonable opinion of the Contract Administrator or the Contractor's equivalent representative cannot be resolved within the normal course of project dealings as described above shall be referred to a without prejudice escalating negotiation process consisting of, at a minimum, the position levels as shown below and the equivalent Contractor representative levels:
    - (i) The Contract Administrator;
    - (ii) Supervisory level between the Contract Administrator and applicable Department Head;
    - (iii) Department Head.
- D35.4.1 Names and positions of Contractor representatives equivalent to the above City position levels shall be determined by the Contractor and communicated to the City at the pre-commencement or kick off meeting.
- D35.4.2 As these negotiations are not an adjudicative hearing, neither party may have legal counsel present during the negotiations.
- D35.4.3 Both the City and the Contractor agree to make all reasonable efforts to conduct the above escalating negotiation process within twenty (20) Business Days, unless both parties agree, in writing, to extend that period of time.
- D35.4.4 If the Dispute is not resolved to the City and Contractor's mutual satisfaction after discussions have occurred at the final escalated level as described above, or the time period set out in D35.4.3, as extended if applicable, has elapsed, the Contract Administrator will issue a Final Determination as defined in C1.1(v), at which point the parties will be governed by the Dispute Resolution process set out in C21.

### THIRD PARTY AGREEMENTS

#### D36. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

- D36.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.
- D36.2 Further to D36.1, in the event that the obligations in D36 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("Funding Costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.
- D36.3 For the purposes of D36:
- (a) "**Government of Canada**" includes the authorized officials, auditors, and representatives of the Government of Canada; and
  - (b) "**Government of Manitoba**" includes the authorized officials, auditors, and representatives of the Government of Manitoba.
- D36.4 Modified Insurance Requirements
- D36.4.1 If not already required under the insurance requirements identified in D13, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars (\$2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-contractors and sub-consultants

and include twelve (12) months completed operations. The Government of Manitoba and their Ministers, officers, employees, and agents shall be added as additional insureds.

- D36.4.2 If not already required under the insurance requirements identified in D13, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.
- D36.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars (\$2,000,000.00) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.
- D36.4.4 Further to D13.3, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.
- D36.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

#### D36.5 Indemnification By Contractor

- D36.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.
- D36.5.2 The Contractor agrees that in no event will Canada or Manitoba, their respective officers, servants, employees or agents be held liable for any damages in contract, tort (including negligence) or otherwise, for:
- (a) any injury to any person, including, but not limited to, death, economic loss or infringement of rights;
  - (b) any damage to or loss or destruction of property of any person; or
  - (c) any obligation of any person, including, but not limited to, any obligation arising from a loan, capital lease or other long term obligation;

in relation to this Contract or the Work.

#### D36.6 Records Retention and Audits

- D36.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.
- D36.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D36.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce

them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

#### D36.7 Other Obligations

- D36.7.1 The Contractor consents to the City providing a copy of the Contract Documents to the Government of Manitoba and/or the Government of Canada upon request from either entity.
- D36.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.
- D36.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.
- D36.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.
- D36.7.5 The Contractor represents and warrants that no current or former public servant or public office holder, to whom the Value and Ethics Code for the Public Sector, the Policy on Conflict of Interest and Post Employment, or the Conflict of Interest Act applies, shall derive direct benefit from this Contract, including any employment, payments, or gifts, unless the provision or receipt of such benefits is in compliance with such codes and the legislation.
- D36.7.6 The Contractor represents and warrants that no member of the House of Commons or of the Senate of Canada or of the Legislative Assembly of Manitoba is a shareholder, director or officer of the Contractor or of a Subcontractor, and that no such member is entitled to any benefits arising from this Contract or from a contract with the Contractor or a Subcontractor concerning the Work.

**FORM H1: PERFORMANCE BOND**  
(See D14)

KNOW EVERYONE BY THESE PRESENTS THAT

\_\_\_\_\_ ,  
(hereinafter called the "Principal"), and

\_\_\_\_\_ ,  
(hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), in the sum of

\_\_\_\_\_ dollars (\$\_\_\_\_\_.)

of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for the payment of which sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

TENDER NO. 228-2023

FEEDER MAIN VALVE CHAMBER REHABILITATION – VALVE PIT 138 AND 139

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall:

- (a) carry out and perform the Contract and every part thereof in the manner and within the times set forth in the Contract and in accordance with the terms and conditions specified in the Contract;
- (b) perform the Work in a good, proper, workmanlike manner;
- (c) make all the payments whether to the Obligee or to others as therein provided;
- (d) in every other respect comply with the conditions and perform the covenants contained in the Contract; and
- (e) indemnify and save harmless the Obligee against and from all loss, costs, damages, claims, and demands of every description as set forth in the Contract, and from all penalties, assessments, claims, actions for loss, damages or compensation whether arising under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the Contract or any part thereof during the term of the Contract and the warranty period provided for therein;

THEN THIS OBLIGATION SHALL BE VOID, but otherwise shall remain in full force and effect. The Surety shall not, however, be liable for a greater sum than the sum specified above.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the Principal and Surety have signed and sealed this bond the

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**SIGNED AND SEALED**  
in the presence of:

\_\_\_\_\_  
(Witness as to Principal if no seal)

\_\_\_\_\_  
(Name of Principal)

Per: \_\_\_\_\_ (Seal)

Per: \_\_\_\_\_

\_\_\_\_\_  
(Name of Surety)

By: \_\_\_\_\_ (Seal)  
(Attorney-in-Fact)

**FORM H2: LABOUR AND MATERIAL PAYMENT BOND**  
(See D14)

KNOW EVERYONE BY THESE PRESENTS THAT

\_\_\_\_\_  
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Principal"), and

\_\_\_\_\_  
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), for the use and benefit of claimants as herein below defined, in the amount of

\_\_\_\_\_ dollars (\$\_\_\_\_\_)

of lawful money of Canada, for the payment whereof we, the Principal and the Surety jointly and severally bind ourselves firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

TENDER NO. 228-2023

FEEDER MAIN VALVE CHAMBER REHABILITATION – VALVE PIT 138 AND 139

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labour, service and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

- (a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;
- (b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;
- (c) No suit or action shall be commenced hereunder by any claimant
  - (ii) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

- (iii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;
  - (iv) other than in a court of competent jurisdiction in the Province of Manitoba.
- (d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.
- (e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

The Principal and Surety hereby agree that The Guarantors' Liability Act (Manitoba) shall apply to this Bond.

IN TESTIMONY WHEREOF, the Principal has hereunto set its hand affixed its seal, and the Surety has caused these presents to be sealed and with its corporate seal duly attested by the authorized signature of its signing authority this

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_ .

SIGNED AND SEALED  
in the presence of:

\_\_\_\_\_  
(Witness as to Principal if no seal)

\_\_\_\_\_  
(Name of Principal)

Per: \_\_\_\_\_ (Seal)

Per: \_\_\_\_\_

\_\_\_\_\_  
(Name of Surety)

By: \_\_\_\_\_ (Seal)  
(Attorney-in-Fact)







**FORM K: EQUIPMENT**  
(See D16)

**FEEDER MAIN VALVE CHAMBER REHABILITATION – VALVE PIT 138 AND 139**

<b>1. Category/type:</b>	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
<b>2. Category/type:</b>	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
<b>3. Category/type:</b>	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	

**FORM K: EQUIPMENT**  
(See D16)

**FEEDER MAIN VALVE CHAMBER REHABILITATION – VALVE PIT 138 AND 139**

<b>4. Category/type:</b>	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
<b>5. Category/type:</b>	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
<b>6. Category/type:</b>	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	
Make/Model/Year: _____	Serial No.: _____
Registered owner: _____	

**FORM L: CONTRACTOR EXPERIENCE**

(See B13)

**FEEDER MAIN VALVE CHAMBER REHABILITATION – VALVE PIT 138 AND 139**

Attach additional resumes and documents as required. Indicate whether Projects/Project Personnel are for the Bidder, Subcontractor, or Key Personnel.

**Project References:**

Project Client/Contact: \_\_\_\_\_

(Name)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(phone)

\_\_\_\_\_  
(email)

<u>Year</u>	<u>Description of Project</u>	<u>Value</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

**Project References:**

Project Client/Contact: \_\_\_\_\_

(Name)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(phone)

\_\_\_\_\_  
(email)

<u>Year</u>	<u>Description of Project</u>	<u>Value</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

## PART E - SPECIFICATIONS

### GENERAL

#### E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in their entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B7. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B7.
- E1.4 The following are applicable to the Work:

<u>Appendix</u>	<u>Appendix Title</u>
Appendix A	Record Drawings
Appendix B	Site Photos
Appendix C	Morrison Hershfield (MH) Confined Space Entry Safe Work Plan
Appendix D	Traffic Control Requirements

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
1-0798B-D0001-001	FEEDER MAIN VALVE CHAMBER REHABILITATION - VALVE PIT 138 AND 139 - COVER PAGE
1-0798B-D0002-001	FEEDER MAIN VALVE CHAMBER REHABILITATION - VALVE PIT 138 AND 139 - INDEX PAGE
1-0798B-C0004-001	FEEDER MAIN VALVE CHAMBER REHABILITATION - VALVE PIT 138 AND 139 - SITE PLAN
1-0798B-C0005-001	FEEDER MAIN VALVE CHAMBER REHABILITATION - VALVE PIT 138 AND 139 - VALVE PIT 138 - PLAN AND SECTIONS
1-0798B-C0006-001	FEEDER MAIN VALVE CHAMBER REHABILITATION - VALVE PIT 138 AND 139 - VALVE PIT 139 - PLAN AND SECTIONS
1-0798B-C0007-001	FEEDER MAIN VALVE CHAMBER REHABILITATION - VALVE PIT 138 AND 139 - DETAILS

### GENERAL REQUIREMENTS

#### E2. TRAFFIC CONTROL

- E2.1 Further to clauses 3.6, 3.7 and 3.8 of CW 1130:
- Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.
  - In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the manual) shall be responsible for supplying,

placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTTC, the Contract Drawings, Staging Plans, and Traffic Management Plans or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the supply, placement and maintenance of temporary traffic control devices by their own forces or subcontractor.

- (c) In addition, the Contractor shall be responsible for removing, placing, and maintaining all regulatory signing including but not limited to:
  - (i) Parking restrictions,
  - (ii) Stopping restrictions,
  - (iii) Turn restrictions,
  - (iv) Diamond lane removal,
  - (v) Full or directional closures on a Regional Street,
  - (vi) Traffic routed across a median,
  - (vii) Full or directional closure of a non-regional street where there is a requirement for regulatory signs (turn restrictions, bus stop relocations, etc.) to implement the closure.
- (d) The Contractor shall remove and stockpile any regulatory signage not required during construction such as but not limited to parking restrictions, turn restrictions and loading restrictions.

E2.2 Further to E2.1(c) the Contractor shall make arrangements with the Traffic Services Branch of the City of Winnipeg to supply regulatory signs as required.

E2.3 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.

E2.4 Further to E2.1(c) and E2.1(d) the Contractor shall make arrangements with the Traffic Services Branch of the City of Winnipeg to reinstall the permanent regulatory signs after the contract work is complete. At this time the Contractor shall make arrangements to drop off the stockpiled materials to Traffic Services at 495 Archibald Street.

E2.5 Any changes to the approved traffic management plan must be submitted to the Contract Administrator a minimum of 5 Working Days prior to the required change for approval.

E2.6 If the Contract Administrator determines that the Contractor is not performing Traffic Control in accordance with this specification, Traffic Services may be engaged to perform the Traffic Control and the Contractor shall bear the costs associated by the Traffic Services Branch of the City of Winnipeg in connection with the works undertaken by the Contractor.

## E2.7 Submissions

### E2.7.1 Shop Drawings

- (a) The Contractor shall submit Shop Drawings detailing the proposed jersey barrier and end treatment for use on the project. The shop drawings shall be sealed by a Professional Engineer licensed in the Province of Manitoba. The Shop Drawings shall be submitted a minimum of ten (10) Business Days prior to commencement of the valve chamber work.

E2.7.2 All submitted traffic control plans are subject to review and acceptance by City of Winnipeg Traffic Management and Traffic Services divisions.

## E2.8 General

E2.8.1 Further to Section 3.7 of CW 1130 of the General Requirements the Contractor shall be responsible to redirect and maintain traffic with appropriate signing in accordance with The City of Winnipeg, "Manual of Temporary Traffic Control" in Work Areas on City Streets at all times during construction.

E2.8.2 Traffic control works shall meet the requirements of Appendix D.

- E2.8.3 Maintain access for approaches, driveways, public lanes and crossing streets for all locations.
- E2.8.4 Bus traffic must be maintained at all times or as accepted by the Contract Administrator and Winnipeg Transit. Winnipeg Transit shall have the authority to determine the level of accommodation at bus stops in work zones. Bus stops may be closed, relocated, or maintained in a work zone at Winnipeg Transit's discretion.
- E2.8.5 Designated, permanent, and/or temporary bicycle routes shall be safely maintained throughout the work, or temporary traffic control put in place to reroute bicycle traffic around the work area. Temporary traffic control chosen for the closure or modification of an active transportation route shall match the level of safety provided by the route that is being closed or modified.
- E2.8.6 The Contractor shall maintain access to all businesses during business hours, except where written authorization has been provided by the business.
- E2.8.7 The Contractor shall maintain access to all schools, community centres, and other public buildings at all times.
- E2.8.8 Pedestrian access must be maintained on the one side at all times. One pedestrian crossing in the east-west direction and one pedestrian crossing in the north-south direction must be maintained at each intersection at all times. If this cannot be maintained, the Contractor shall provide flag persons to safely escort pedestrians across the intersection. The Contractor shall leave pedestrian crossing locations safe and free of equipment that may hamper pedestrians when no construction activities are being performed at a particular crossing location. Refer also to D8.
- E2.8.9 Further to Clause 3.7 of CW 1130 of the General Requirements, should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he/she shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.
- E2.8.10 The Contractor shall not park company or private vehicles inside the barricaded work zone in a manner that will block sightlines for vehicles and pedestrians approaching and crossing intersections.
- E2.8.11 The Contractor is responsible for maintaining safe vehicular and pedestrian traffic through their work site as identified herein. The Contractor shall rectify any unsafe conditions immediately upon notification. This could include but is not limited to, providing flag persons, clearing debris and snow from sites, moving equipment, and erecting additional signage.
- E2.8.12 Flag persons may be necessary to maintain the flow of traffic during certain work operations.
- E2.8.13 Ambulance/emergency vehicle access must be maintained at all times.
- E2.8.14 Notwithstanding the requirements noted herein and CW 1130, the Contractor shall maintain the minimum site-specific traffic control requirements outlined in Appendix D and as indicated on the Drawings.
- E2.9 Temporary Asphalt Works
- (a) The Contractor shall install a temporary asphalt ramp within the southbound curb lane on Lagimodiere Blvd as shown on the drawings. The work consists of the removal of a maximum of 50 mm asphalt (the depth will vary across the length) to the extents shown on the drawings and installation of a temporary asphalt overlay intended to permit traffic to detour over the filled in curb and onto the shoulder during completion of work on Valve Pit 139.
- (b) Milling and asphalt works shall conform to CW3410.



## E2.10 Measurement and Payment

### E2.10.1 Temporary Asphalt Works

- (a) Temporary asphalt works will be measured and paid for on a lump sum basis at the Contract Unit Price for "Temporary Asphalt Works" for each phase of the work as listed in Form B: Prices.
- (b) Payment for "Temporary Asphalt Works" will include payment for all labour and materials to complete the work as specified.

### E2.10.2 Traffic Control

- (a) Traffic control will be measured and paid for on a lump sum basis at the Contract Price for "Traffic Control".
- (b) Payment for Traffic Control will include payment for all labour and materials to complete the work. Payment will be made on the following payment schedule:
  - (i) twenty-five percent (25%) payment upon completion of the temporary asphalt work;
  - (ii) fifty percent (50%) payment upon acceptably setup of traffic control and commencement of the valve chamber rehabilitation work; and,
  - (iii) one hundred percent (100%) payment upon completion of the work, restoration, and removal of the temporary asphalt work.

## E3. **CONFINED SPACE ENTRY AND INSPECTION SUPPORT**

### E3.1 Description

- (a) This specification covers provision of confined entry and access support for specialized inspection Contractors and inspection personnel.

### E3.2 General

- E3.2.1 The Contractor shall be aware that Hydrogen Sulphide Gas may be present in all underground structures in concentrations sufficient to cause serious harm or death to personnel who are not using adequate Personal Protective Equipment.
- E3.2.2 The Contractor's attention is drawn to the Province of Manitoba Workplace Safety and Health Act ("the Act"), and the Regulations and Guidelines there-under pertaining to Confined Space Entry Work and in particular the requirements for conducting hazard/risk assessments and providing personal protective equipment (PPE).
- E3.2.3 Consultants and City personnel require dedicated confined entry support services for the purposes of inspection. The Contractor shall provide confined space support as specified herein throughout the course of the work and during both the Substantial and Total Performance inspections.

### E3.3 Methods

- E3.3.1 Be fully responsible for confined entry access on site, in accordance to Manitoba Workplace Health and Safety Regulation 217/2006 and subsequent amendments.
- E3.3.2 Support services will be required to support one pipeline crossing (one inspection crew) at a time. Each crossing will require support on each side of the river.
- E3.3.3 Safety Personnel shall be dedicated to confined entry access when inspection personnel are in confirmed areas.
- E3.3.4 Maintain confined entry permit logs.
- E3.3.5 Hazard Assessment
  - (a) In conjunction with securing the site and obtaining underground clearances, the Contractor shall conduct a hazard assessment for each site requiring work within a

confined space. The assessment shall identify and evaluate the hazards, including but not be limited to review of the following as it pertains to the work to be performed:

- (i) nature of the work;
  - (ii) structural condition of the existing structure; and,
  - (iii) atmospheric conditions in the structure.
- (b) The hazard assessment shall be based on the Contractors review of structures and external conditions. Prior to the inspection, the Contractor shall conduct the necessary atmospheric monitoring of the affected structures to establish acceptable entry conditions.

#### E3.3.6 Safe Work Plan

- (a) Subsequent to performing a hazard assessment the Contractor shall develop a safe work plan to address the potential hazards associated with each site. In addition to addressing the potential hazards the safe work plan shall address but not be limited to the following:
- (i) guidelines for confined space entry work established by The Manitoba Workplace Safety and Health Act;
  - (ii) provision for emergency response;
  - (iii) training and duties for entry personnel;
  - (iv) rescue and emergency services;
  - (v) requirement for purging, ingesting, flushing and/or continuous ventilation to eliminate or control atmospheric hazards;
  - (vi) requirement for and provision of supplied air;
  - (vii) communication between members of the repair crew in the pipe/trench and on the ground's surface;
  - (viii) current and forecasted weather conditions;
  - (ix) provision of back-up equipment;
  - (x) method of ingress into the structure; and,
  - (xi) method of egress out of the structure.
- (b) The Contactor shall not enter the structures to begin the work until they have completed a hazard assessment and safe work plan for the specific repair and reviewed the plans with their designated safety officer for acceptance. The safe work plan procedures and practices shall conform to all federal, provincial and municipal codes, regulations and guidelines including Manitoba Workplace Safety and Health Regulations.

#### E3.3.7 Third Party Inspections

- (a) The Contractor's safe work plan and confined space entry procedures for inspections involving Morrison Hershfield or City personnel shall meet or exceed all requirements outlined in Morrison Hershfield's Safe Work Procedure, attached in Appendix C and those of the Inspection Contractor.
- (b) The Contractor shall provide confined space support for third party inspections by Morrison Hershfield and City personal. Morrison Hershfield and City personal will provide personal PPE. Support shall include but is not limited to:
- (i) Furnishing all confined space entry documentation and permits. Copies of the signed and closed out permits shall be provided to the Contract Administrator within five (5) Business Days of the confined space entry;
  - (ii) Provision of an attendant and supervisor dedicated to the confined space entry;
  - (iii) Provision of a retrieval tripod, complete with retractable winch line;
  - (iv) Provision of confined space harnesses. Harnesses shall be certified in accordance with the manufacturer's recommendations;

- (v) Provision of atmospheric monitors for each entrant. Atmospheric monitors shall be calibrated and tested in accordance with the manufacturer's recommendations; and,
- (vi) The Contractor shall complete and document atmospheric monitoring prior to and during entry in accordance with submitted confined space procedures.
- (c) The Contractor shall have a continuous air ventilation within the tunnel and tunnel shaft utilizing the existing ventilation system or similar providing fresh air to the end of the tunnel.
- (d) Inspections may be delayed or postponed where onsite confined space procedures, hazard mitigation measures, or confined space entry support do not meet the Contractor's submitted and accepted safe work plan and procedures until such a time that discrepancies have been addressed to the satisfaction of the entrants. Claims for delays resulting from improper confined space operations will not be considered.

#### E3.4 Measurement and Payment

- (a) Confined entry support will be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

### **E4. ENVIRONMENTAL PROTECTION**

E4.1 The Contractor shall be aware that feeder mains and associated infrastructure is for potable water and no contamination by fuel, chemicals, etc. shall be permitted at any time. Fuels or chemicals shall not be stored within 30 metres of the existing chambers, excavations, etc.

E4.2 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the environmental protection measures as herein specified.

E4.3 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work:

#### E4.3.1 Federal

- (a) Canadian Environmental Protection Act (CEPA) c.16;
- (b) Canadian Environmental Assessment Act (CEAA) c.37;
- (c) Transportation of Dangerous Goods Act and Regulations c.34; and
- (d) Migratory Birds Convention Act, 1994
- (e) Fisheries Act (c. F-14)
- (f) The Canadian Navigable Waters Act

#### E4.3.2 Provincial

- (a) The Dangerous Goods Handling and Transportation Act D12;
- (b) The Endangered Species Act E111;
- (c) The Environment Act c.E125;
- (d) The Fire Prevention Act F80;
- (e) The Manitoba Heritage Resources Act H39.1;
- (f) The Manitoba Noxious Weeds Act N110;
- (g) The Manitoba Nuisance Act N120;
- (h) The Public Health Act c.P210;
- (i) The Workplace Safety and Health Act W210; and
- (j) And current applicable associated regulations.

#### E4.3.3 Municipal

- (a) The City of Winnipeg By-law no. 1/2008;

- (b) The City of Winnipeg Waterway By-Law no. 5888/92; and
- (c) Other applicable Acts, Regulations and By-laws.

E4.4 The Contractor is advised that the following environmental protection measures apply to the Work.

E4.4.1 Materials Handling and Storage

- (a) Construction materials and debris shall be prevented from entering drainage pipes or channels.
- (b) Construction materials and debris shall also be prevented from accumulating on local roadways and sidewalks when tracked out of the Site by trucks hauling excavated materials.
- (c) The Contractor shall provide on-Site measures to mitigate the tracking of sediment off-Site and therefore reduce the amount of street cleaning required. These measures may take the form of a truck wheel wash (automated or manually operated) or other measures as approved by the Contract Administrator.

E4.4.2 Fuel Handling and Storage

- (a) The Contractor shall obtain all necessary permits from Manitoba Conservation for the handling and storage of fuel products and shall provide copies to the Contract Administrator.
- (b) All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.
- (c) Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
- (d) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
- (e) Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.
- (f) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheets of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.
- (g) Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse.
- (h) The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
- (i) A sufficient supply of materials, such as absorbent material and plastic oil booms to clean up minor spills shall be stores nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.

E4.4.3 Waste Handling and Disposal

- (a) The construction area shall be kept clean and orderly at all times during and at completion of construction.
- (b) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction site, other than at a dedicated storage area as may be approved by the Contract Administrator.
- (c) All resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Manitoba Regulation #150/91. Exceptions are liquid industrial and hazardous wastes which may require special disposal methods (see SC:21.4 D).
- (d) Indiscriminate dumping, littering, or abandonment shall not take place.
- (e) No burning of waste (on-site or elsewhere) is permitted.

- (f) Waste storage areas shall not be located so as to block natural drainage.
- (g) Run-off from a waste storage area shall not be allowed to cause siltation of a watercourse.
- (h) Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
- (i) Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.

#### E4.4.4 Dangerous Goods/Hazardous Waste Handling and Disposal

- (a) Dangerous goods/hazardous waste are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
- (b) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
- (c) The Contractor shall have on-site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on-site for the performance of the Work.
- (d) Different waste streams shall not be mixed.
- (e) Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.
- (f) Liquid hydrocarbons shall not be stored or disposed of in earthen pits on-site.
- (g) Used oils shall be stored in appropriate drums, or tankage, until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.
- (h) Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.
- (i) Dangerous goods/hazardous waste storage areas shall be located at least 100 metres away from the high water line and be diked.
- (j) Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.
- (k) Run-off from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.
- (l) Dangerous goods/hazardous waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

#### E4.4.5 Emergency Response

- (a) The Contractor shall ensure that due care and caution is taken to prevent spills.
- (b) The Contractor shall report all major spills of petroleum products or other hazardous substances with the potential for impacting the environment and threat to human health and safety to the Contract Administrator and Manitoba Environment, immediately after occurrence of the environmental accident, by calling the 24-hour emergency telephone phone number (204) 945-4888. The Contract Administrator shall also be notified.
- (c) The Contractor shall designate a qualified supervisor as the on-site emergency response coordinator for the project. The emergency response coordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
- (d) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response coordinator:
  - (i) Notify emergency-response coordinator of the accident:
    - identify exact location and time of accident
    - indicate injuries, if any

- request assistance as required by magnitude of accident (Manitoba Environment 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)
- (ii) Attend to public safety:
  - ◆ stop traffic, roadblock/cordon off the immediate danger area
  - ◆ eliminate ignition sources
  - ◆ initiate evacuation procedures if necessary
- (iii) Assess situation and gather information on the status of the situation, noting:
  - personnel on site
  - cause and effect of spill
  - estimated extent of damage
  - amount and type of material involved
  - proximity to waterways and the Aqueduct
- (iv) If safe to do so, try to stop the dispersion or flow of spill material:
  - approach from upwind
  - stop or reduce leak if safe to do so
  - dike spill material with dry, inert sorbent material or dry clay soil or sand
  - prevent spill material from entering waterways and utilities by diking
  - prevent spill material from entering Aqueduct manholes and other openings by covering with rubber spill mats or diking
- (v) Resume any effective action to contain, clean up, or stop the flow of the spilled product.
- (e) The emergency response coordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to the Manitoba Environment according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.
- (f) When dangerous goods are used on-site, materials for containment and cleanup of spill material (e.g. absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on-site.
- (g) Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Environment.
- (h) City emergency response, 9-1-1, shall be used if other means are not available.

#### E4.5 Vegetation

- (a) Vegetation shall not be disturbed without written permission of the Contract Administrator. The Contractor shall protect plants which may be at risk of accidental damage. Such measures may include protective fencing or signage.
- (b) Herbicides and pesticides shall not be used adjacent to any surface watercourses. Any application must be conducted by a licensed individual.
- (c) All landowners adjacent to the area of application of herbicides or pesticides shall be notified prior to the Work.
- (d) Trees and shrubs shall not be felled into watercourses.
- (e) Areas where vegetation is removed during clearing, construction, and decommissioning activities, shall be revegetated as soon as possible in accordance the requirements outlined herein, or as directed by the Contract Administrator.

#### E4.6 Measurement and Payment

- (a) The work covered in this section will be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

## **E5. OPERATING CONSTRAINTS FOR WORK IN CLOSE PROXIMITY TO THE CRITICAL WATER INFRASTRUCTURE**

### **E5.1 Description**

E5.1.1 This Specification details operating constraints for all Work to be carried out in close proximity to critical water infrastructure. Close proximity shall be deemed to be any construction activity within a 5 m horizontal offset from the centreline of a feeder main/large diameter watermain, within 5 m of valve chambers, and any other critical infrastructure identified below.

### **E5.2 Critical Water Infrastructure**

E5.2.1 The following shall be considered critical pipelines and water infrastructure for this project:

- (a) 600 mm Trans Canada Feeder Main, constructed from 600 mm Prestressed Concrete Pressure Pipe (PCCP);
- (b) 600 Lagimodiere Boulevard Feeder Main, constructed from 600 mm PCCP; and,
- (c) Valve Pits 138 and 139.

### **E5.3 General Considerations for Work in Close Proximity to Critical Water Infrastructure**

E5.3.1 Feeder mains and large diameter water mains are a critical components of the City of Winnipeg's regional water supply and distribution system and work in close proximity to critical water infrastructure shall be undertaken with an abundance of caution. Feeder mains and large diameter water mains cannot typically be taken out of service for extended periods to facilitate construction and inadvertent damage caused to the pipe would likely have catastrophic consequences.

E5.3.2 Work around critical water infrastructure shall be planned and implemented to minimize the time period that Work is carried out in close proximity the pipeline/structure and to ensure that the pipeline/structure is not subjected to excessive construction related loads, including excessive vibrations and/or concentrated or asymmetrical lateral loads during backfill placement.

E5.3.3 Large diameter pressure pipe generally has limited ability to withstand increased earth and live loading. PCCP typically fails in a non-ductile mode and has the potential to cause extensive consequential damage to infrastructure if failure should occur. Therefore, every precaution must be undertaken to ensure that applied loading during all phases of construction is within accepted loading parameters.

### **E5.4 Submittals**

E5.4.1 Submit proposed construction equipment specifications to the Contract Administrator for review a minimum of five (5) Business Days prior to construction. The equipment submission shall include:

- (a) equipment operating and payload weights;
- (b) equipment dimensions, including wheel or track base, track length or axle spacing, track widths or wheel configurations; and
- (c) load distributions in the intended operating configuration.

E5.4.2 Submit a construction method statement to the Contract Administrator a minimum of five (5) business days prior to construction. The construction method statement shall contain the following minimum information:

- (a) proposed construction plan including excavation locations, haul routes, excavation equipment locations, and loading positions;
- (b) excavation plans, including shoring designs, for excavations occurring in close proximity to feeder mains (within 5 m horizontal of the pipe's centerline) where the excavation/shoring system is to be extended below the top of the feeder mains embedment zone (150 mm above the pipe); and,

- (c) any other pertinent information required to accurately describe the construction activities in close proximity to the feeder main and permit the Contract Administrator to review the proposed construction plans.

E5.4.3 Submit the following documentation for inclusion in the City's feeder main shutdown protocol for each planned feeder main shutdown a minimum of twenty (20) Business Days prior to the proposed shutdown and the Contractor should allow for a ten (10) Business Day review period by the City once accepted by the Contract Administrator.:

- (a) a detailed schedule for the work, including a step by step list of a tasks to be undertaken during the shutdown;
- (b) a contingency plan for any problems, issues, or unforeseen circumstance that might occur. The contingency plan shall include a detailed procedure and schedule for putting the feeder main back into service on an emergency basis; and,
- (c) check list of equipment, materials, tools required to complete the work that need to be on site prior to undertaking the shutdown.

#### E5.5 Feeder Main Shutdowns

E5.5.1 Refer to D22.1 for feeder main shutdown scheduling restrictions. Work shall be scheduled to minimize the duration of all shutdowns.

E5.5.2 The Contractor shall provide notice to the Contract Administrator in writing, a minimum of fifteen (15) Business Days prior to requiring the shutdown. The City will endeavour to schedule the shutdown as requested, pursuant to D22.1.

E5.5.3 Feeder main shutdowns and disassembly of feeder main components will not be permitted until all required submissions and protocols have been reviewed and accepted by the Contract Administrator and City. Further, all materials shall be on site, inspected, and test fit prior to disassembly of the feeder mains.

E5.5.4 Isolation of the feeder main crossings will be completed by City forces using mainline valves and secondary valves wherever possible.

E5.5.5 The Contractor shall be responsible for dewatering the feeder main.

#### E5.6 Lock-out and Tag-out Procedures

E5.6.1 The City of Winnipeg will endeavor to provide redundant valve closures (double blocking) of pressurized pipelines that enter the work space where possible. However, there are locations within the system where it is impractical to provide double blocking without widespread service disruption. Where regional water system network does not allow double blocking, non-redundant valve closures (single blocking) will be provided.

- (a) For this project only single blocking is available on the identified feeder mains.

E5.6.2 At locations where only single valve blocking is practical, additional safety measures and monitoring will be required in order to provide a safe work environment for employees. Development of adequate safety plans in accordance to the Workplace Safety and Health Act and Regulation 217/06 are the responsibility of the Contractor, but as a minimum shall include:

- (a) Provision of adequate egress from confined spaces including removal of removable roof slabs and manhole covers, and provision of ladders and other means of site exit
- (b) Use of body harnesses and safety hoisting equipment at all times when pressurized systems are disassembled and protected only by single block valves.
- (c) Monitor and assess water leakage in closed system prior to disassembly of system. Monitor water leakage rate and advise Contract Administrator immediately of change in inflow rates. Evacuate confined space if necessary.

E5.6.3 The Contractor, City of Winnipeg Water and Waste Department, and Contract Administrator will all be required to lock out all valves closed in order to facilitate this work.



Where site access and lockout space on system valves is limited, the following lockout/tag out procedures will be implemented;

- (a) lockout locations for valves will be identified by the City;
- (b) City of Winnipeg will provide a single lock, chains and other devices to adequately secure valves within pits and chambers. The Contractor has the right to inspect the installation and satisfy that the lockout system is adequate. All locks utilized will be commonly keyed;
- (c) key(s) for single locked valves will be placed in secure lock box at the site. City staff, Contractors, and Contract Administrator will place personal/company locks complete with identification and tag out information on this lock box;
- (d) key(s) placed within the secure lock box will not be removed until all City staff, Contractor, and Contract Administrator locks have been removed from the lock box, and verified that the work is completed; and,
- (e) City staff will then unlock all valves, and will commence with restoration of the systems to service.

#### E5.7 Pre-Work, Planning and General Execution

- E5.7.1 No work shall commence in close proximity to feeder mains, large diameter water mains, chambers, and other critical infrastructure until the equipment specifications and construction method statement have been submitted and accepted, and feeder main locations have been clearly delineated in the field. Work over feeder mains shall only be carried out with equipment that has been reviewed and quantified in terms of its loading implications on the pipe.
- E5.7.2 Notify the Contract Administrator five (5) Business Days prior to commencement of any work near the critical water infrastructure.
- E5.7.3 The Drawings provide the location of the feeder mains, chambers, and critical pipelines through the construction site. Pipe locations noted on the Drawings are based on the original record drawings. Locate critical infrastructure and confirm their position horizontally and vertically (if required) prior to undertaking work in close proximity to said infrastructure. Visually delineate all critical infrastructure identified herein on Site by use of paint, staking/flagging, construction fencing, snow fencing, or other suitable methods
- E5.7.4 Only utilize construction practices and procedures that do not impart excessive vibratory loads on feeder mains and chambers or that would cause settlement of the subgrade below feeder mains and critical pipelines.
- E5.7.5 Where the existing road structure must be removed, crossing of critical infrastructure shall be prohibited from the time the existing roadway structure is removed until the completion of granular base construction. At all times prior to completion of final paving; reduce equipment speeds to levels that minimize the effects of impact loading to the critical infrastructure.
- E5.7.6 Only equipment and construction practices stipulated in the accepted construction method statement and the supplemental requirements noted herein may be utilized in close proximity to feeder mains, chambers, and other critical infrastructure identified herein.
- E5.7.7 Construction operations should be staged in such a manner as to limit multiple construction loads at one time, (e.g., offset crossings sufficiently from each other, rollers should remain a sufficient distance behind spreaders to limit loads. A reasonable offset distance is 3 m between loads).
- E5.7.8 Granular material, construction material, soil, and/or other material shall not be stockpiled on the pipelines or within 5 m of any critical infrastructure identified herein.
- E5.7.9 The Contractor shall ensure that all crew members understand and observe the requirements of working near feeder mains, valve chambers, and critical infrastructure. Prior to commencement of on-Site work, the Contractor shall jointly conduct an orientation meeting with the Contract Administrator, all superintendents, foreman, and heavy equipment

operators to make all workers on the Site fully cognizant of the limitations of altered loading on, the ramifications of inadvertent damage to, and the constraints associated with work in close proximity to feeder mains and critical pipelines. New personnel introduced after commencement of the Project need to be formally orientated as outlined herein. It is recommended that restrictions associated with the crossing, consistent with the Contractor's submitted method statement be posted on Site and near the crossing.

#### E5.8 Demolition, Excavation, and Shoring

- E5.8.1 Use of pneumatic concrete breakers within 3 m of a feeder main, valve chamber, or critical pipeline is prohibited. Pavement shall be full depth sawcut and carefully removed. Use of hand held jackhammers for pavement removal will be allowed.
- E5.8.2 Offset excavation equipment a minimum of 3 m from the centerline of critical pipelines when undertaking excavations where there is less than 2.4 m of earth cover over the pipeline.
- E5.8.3 Utilize only smooth edged excavation buckets, soft excavation, or hand excavation techniques where there is less than 1.5 m of earth cover over the pipeline. Where there is less than 1.0 m of soil cover above the pipeline, provide full time supervision and complete the excavation utilizing hand excavation or soft excavation methods.
- E5.8.4 Equipment should not be allowed to operate while positioned directly over a feeder main or critical pipeline except where permitted herein, outlined in the reviewed and accepted construction method statement.
- E5.8.5 Excavations within 3 m of the outside edge of a feeder main (hydrovac holes for confirming trenchless installations excluded) and which extend below the invert of the feeder main shall utilize shoring methods that precludes the movement of native in-situ soils (i.e. a tight shoring system).
- E5.8.6 Pre-bore all piles to below the invert of critical infrastructure within 5 m (horizontally) of the pipeline's outside edge. Piles shall have a minimum 500 mm clear separation from the feeder main.
- E5.8.7 Offset pile driving equipment a minimum of 3 m (horizontally) from the centerline of the pipeline during piling operations.

#### E5.9 Backfill and Subgrade Construction

- E5.9.1 Embedment of existing pipelines shall be completed with bedding sand meeting the requirements of CW 2030. Bedding sand shall be placed to a minimum of 150 mm above the pipe and 300 mm beyond the outer edges of the pipe.
- E5.9.2 Subgrade and backfill compaction within 3 metres (horizontal) of a critical pipeline or valve chamber shall be limited to non-vibratory methods only. Small walk behind vibratory packers will be permitted.
- E5.9.3 Subgrade, sub-base and base course construction shall be kept in a rut free condition at all times. Construction equipment is prohibited from crossing pipelines if the grade is insufficient to support the equipment without rutting.
- E5.9.4 Subgrade conditions should be inspected by personnel with competent geotechnical experience (e.g. ability to adequately visually classify soils and competency of subgrade, subbase, and base course materials). In the event of encountering unsuitable subgrade materials above a critical pipeline, proposed design revisions shall be submitted to the Contract Administrator for review to obtain approval from the Water and Waste Department relative to any change in conditions.
- E5.9.5 Fill material shall not be dumped directly on pipelines but shall be stockpiled outside the limits noted in these recommendations and shall be carefully bladed in-place
- E5.9.6 Only use compaction equipment approved by the Contract Administrator to compact fill materials above critical pipelines. Compaction of fill materials shall be completed using

static methods only, no vibratory compaction will be allowed within the limits noted in these recommendations.

E5.9.7 Construction operations shall be staged to minimize the time period between excavation to subgrade and placement of granular subbase materials. Should bare subgrade be left overnight, measures shall be implemented to protect the subgrade against inadvertent travel over it and to minimize the impact of wet weather.

#### E5.10 Subbase and Base Course Construction

E5.10.1 Subbase or base course materials shall not be dumped directly on pipelines but shall be stockpiled outside limits noted in these recommendations and shall be carefully bladed in-place.

E5.10.2 Subbase compaction within 3 m horizontal of the centreline of a critical pipeline shall be either carried out by static methods (without vibration) or with smaller approved equipment such as hand held plate packers or smaller roller equipment.

#### E5.11 Paving

E5.11.1 When constructing asphalt pavements only non-vibratory compaction should be used within 3 m (horizontal) of the center of critical pipelines.

#### E5.12 Measurement and Payment

(a) Protection of critical water infrastructure shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

### E6. SHOP DRAWINGS

#### E6.1 Description

E6.1.1 This Specification shall revise, amend, and supplement the requirements of CW 1100.

- (a) The term "Shop Drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.
- (b) The Contractor shall submit specified Shop Drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown on all submissions for Engineering review.

#### E6.1.2 Shop Drawings

- (a) Original drawings are to be prepared by the Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate the appropriate portion of Work; showing fabrication, layout, setting, or erection details as specified in appropriate sections.
- (b) Additional submittal requirements for each component of the Work may be listed within the relevant specification section.

#### E6.2 Contractor's Responsibility

- (a) Review shop drawings, product data, and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.
- (b) Verify:
  - (i) Field measurements
  - (ii) Field construction criteria
  - (iii) Catalogue numbers and similar data
- (c) Coordinate each shop drawing submission with the requirements of the Work and Contract Documents. Shop drawings of separate components of a larger system will not be reviewed until all related drawings are available.

- (d) Notify Contract Administrator, in writing at time of shop drawing submission, of deviations from requirements of Contract Documents.
- (e) Responsibility for deviations in Shop Drawing submissions from the requirements of Contract Documents is not relieved by the Contract Administrator's review of submission, unless the Contract Administrator gives written acceptance of specified deviations.
- (f) Responsibility for errors and omissions in Shop Drawing submission is not relieved by the Contract Administrator's review of the submittals.
- (g) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on the previous submission.
- (h) After the Contract Administrator has reviewed and returned the copies, distribute the copies to sub-trades as appropriate.
- (i) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site for use and reference by the Contract Administrator and Subcontractors.

### E6.3 Submission Requirements

E6.3.1 Schedule submissions at least ten (10) Calendar Days before dates reviewed submissions will be needed and allow for a five (5) Business Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

E6.3.2 Submit one (1) digital copy (PDF) of shop drawings.

E6.3.3 Accompany shop drawing submissions with a transmittal letter containing:

- (a) Date
- (b) Project title and Tender number
- (c) Contractor's name and address
- (d) Number of each shop drawing, product data, and sample submitted
- (e) Specification Section, Title, Number, and Clause
- (f) Drawing Number and Detail/Section Number
- (g) Other pertinent data

E6.3.4 Shop drawing submissions shall include:

- (a) Date and revision dates.
- (b) Project title and Bid Opportunity number.
- (c) Name of:
  - (i) Contractor
  - (ii) Subcontractor
  - (iii) Supplier
  - (iv) Manufacturer
- (d) Separate detailer when pertinent
- (e) Identification of product or material.
- (f) Relation to adjacent structure or materials.
- (g) Field dimensions, clearly identified as such.
- (h) Specification section name, number and clause number or drawing number and detail/section number.
- (i) Applicable standards, such as CSA or CGSB numbers.

- (j) Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements, and compliance with Contract Documents.

E6.3.5 Shop Drawings not meeting the requirements of CW 1100 or the requirements specified herein will be returned to the Contractor without review for resubmission.

E6.3.6 Shop drawing submissions will be limited to two (2) reviews per shop drawing. This shall include a review of the initial submission and a review of the revised submission. Costs associated with subsequent reviews will be charged to the Contractor.

#### E6.4 Other Considerations

- (a) Fabrication, erection, installation, or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.
- (b) Material and equipment delivered to the Site will not be paid for until pertinent shop drawings have been submitted and reviewed.
- (c) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
- (d) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions, and review of shop drawings.

#### E6.5 Measurement and Payment

E6.5.1 Preparation and submission of Shop Drawings will be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

### **E7. EXPEDITED SHOP DRAWINGS**

E7.1 Further to E6, in order to expedite Shop Drawings with critical timelines, the lowest responsive Bidder, as outlined in B18, will be required, after receiving a written request from the Contract Administrator, to arrange for the preparation of Shop Drawings for the following items with critical timelines:

- (a) Butterfly Valves and Manual Actuators as per E11 and E12.

#### E7.2 Measurement and Payment

E7.2.1 If no Contract is awarded, then the City of Winnipeg will pay the requested Bidder up to a maximum of five hundred dollars (\$500.00) for each of the requested submissions for the preparation and delivery of expedited Shop Drawings. Delivery of expedited Shop Drawings to the City and payment of the above amounts will constitute full and final consideration of each party to the other and neither party will have any further liability to the other with respect to this Bid Opportunity.

E7.2.2 If Award is made to the lowest responsive Bidder, then as per E6.5, expedited Shop Drawings will be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

### **E8. EXCAVATION, SHORING, AND BACKFILL**

#### E8.1 Description

- (a) This Specification covers the requirements for excavations and backfilling of trenches, pipelines, and structures.

#### E8.2 Submittals

- (a) Shop Drawings for all excavation shoring (where required) shall be prepared and submitted a minimum of twenty (20) Business Days prior to undertaking the excavation and shoring installation. Where required by Workplace Safety and Health Regulation, shoring Shop

Drawings shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experienced in the design of excavation shoring systems.

**E8.3 Shoring Design**

- (a) Shoring shall be provided for excavations in accordance with CW 2030 and E5.
- (b) Excavation shoring shall be designed to accommodate all existing and new piping and associated infrastructure.
- (c) All shoring systems shall comply with Manitoba Workplace Safety and Health requirements.

**E8.4 Excavation**

- (a) Materials shall not be stockpiled over pipelines.
- (b) Excess excavation material from excavations shall be disposed of off-site.
- (c) Granular bedding in the vicinity of existing pipelines shall be dewatered and stabilized prior to undermining pipes to prevent loss of granular pipe foundation.
- (d) Carefully excavate to expose existing pipelines. Excavation within 1.0 m of the pipe shall be done using soft dig or hand excavation methods to prevent damage to the pipe.
- (e) The Contractor shall undertake all efforts to prevent freezing of soils underlying existing pipelines, bedding and backfilling will not be permitted overtop of frozen soils. Excavations left open when nighttime atmospheric temperatures are expected to drop below 0°C shall be horded and heated as required to keep soils and pipelines from freezing.
- (f) See E5 for additional restrictions when working in close proximity to critical water infrastructure.
- (g) Provide heating and hoarding around the lower portion of the excavation and pipe during freezing conditions.

**E8.5 Backfill**

- (a) Backfill within 1 m of existing and proposed pavements shall be completed to CW 2030, Class 2 standards.
- (b) Backfill under paths and walkways shall be completed to CW 2030, Class 2 standards.
- (c) Backfill within 1 metre of existing concrete structures shall be completed with free draining pit run granular material to CW 2030, Class 2 standards.
- (d) All other areas shall be backfilled with a Class 4 backfill unless otherwise noted on the Drawings.
- (e) The Contractor shall undertake all efforts to prevent excavated material intended for backfilling from freezing. Backfilling with frozen materials will not be permitted.

**E8.6 Measurement and Payment**

- (a) Excavation, shoring, and backfilling for excavations will be considered incidental to "Valve Chamber Access" and will not be measured for payment. No separate payment will be made.

**E9. WATER SUPPLY**

**E9.1** Further to specifications CW 1120, Section 3.1, CW 2140 and CW 2145, water supply for the Work may be taken from City of Winnipeg hydrants in accordance with the following:

- (a) Only hydrants approved by WSD shall be used for water supply.
- (b) The Contractor shall supply and use a Backflow Protection Arrangement as shown on Standard Drawing SD-019 when taking water from City hydrants. Alternatively, the Contractor may rent the Backflow Protection Arrangement from the Water Services Division (WSD) if available. WSD will supply a meter and locks for the Backflow Protection Arrangement.

- (c) The Contractor is permitted to turn approved hydrants on and off provided the Contractor has received training by the Water Services Division and the turn-ons and turn-offs are done in the presence of the Contract Administrator.
- (d) Hydrants approved for use shall be considered to be "in the Contractor's control" from the time the City has turned the hydrant on until the Contractor has notified the City the hydrant is no longer being used and the meter box has been removed.
- (e) Between November 1 and April 30 of any year the Contractor shall take all necessary precautions to prevent freezing of hydrants and related appurtenances for hydrants in their control and shall be responsible to pump out hydrants turned off by Emergency Services. Heating and hoarding of hydrants will be required by the Contractor.
- (f) If a hydrant or appurtenance is damaged due to freezing or improper turn-on or turn-off procedures while in the Contractor's control, WSD will assess the damage and determine if WSD will repair the damage or if the Contractor will be responsible to repair the damage. Costs for repairs completed by WSD will be deducted from payments owing the Contractor. Repairs completed by the Contractor will be at the Contractor's expense.
- (g) Erect and maintain signage (bump signs) warning oncoming traffic of hose crossings to the satisfaction of the Contract Administrator and the Manual of Temporary Traffic Control. Construct ramps as shown on attached Drawing D-8211.
- (h) WSD may instruct the Contractor to make other arrangements for hydrant turn-ons and turn-offs.

#### E9.2 Measurement and Payment

- (a) Costs associated with a water supply for the project will be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

### **E10. VALVE CHAMBER PIPING MODIFICATIONS**

#### E10.1 Description

- (a) This Specification shall cover the modification of valve chambers and feeder mains as required for the Work.

#### E10.2 Description of Work:

##### E10.2.1 The Work includes the following major activities. See the Drawings for details on required chamber and piping rehabilitation and modifications:

- (a) expose chambers and remove roof slabs as required;
- (b) replace identified piping components;
- (c) sandblast and coat all steel components; and,
- (d) reassembly chambers, insulate, and backfill.

#### E10.3 Submissions:

##### E10.3.1 Submit Shop Drawings for all permanent and temporarily installed fittings, valves, piping and couplings in accordance with E6.

#### E10.4 Products

##### E10.4.1 Fasteners

- (a) Bolts for all flange connections shall be ASTM A307 or ASTM F568M, grade B.
- (b) Nuts for all flange connections shall be ASTM A563 or ASTM A563M, grade B.
- (c) Bolts for all sleeve style couplings and/or restraints shall be ASTM F593 or ASTM F738M, type 316 stainless steel.
- (d) Nuts for all sleeve style couplings and/or restraints shall be ASTM F594 or ASTM F836M, type 316 stainless steel.

- (e) Anti-seize compound shall be used on all bolts.
- (f) Dielectric washers and sleeves meeting the requirements of E10.4.10 shall be used wherever stainless steel hardware is used on ferrous metal fittings.
- (g) For flanged connections, bolt size, type and diameter shall be in accordance to AWWA C207. Bolt length suitable for coupling AWWA C207 Class D flange.
- (h) All steel bolting hardware shall be liquid epoxy coated in accordance with AWWA C116, E10.4.9, and E10.5.4 after assembly.

#### E10.4.2 Flange Gaskets

- (a) 3mm, full-faced, SBR rubber gaskets or neoprene in accordance with AWWA C207.
- (b) Gaskets shall be one piece construction where possible.
- (c) Segmented gaskets shall be constructed of a minimum number of segments and joints shall be of dovetailed construction, or other jointing methods approved by the Contract Administrator.

#### E10.4.3 Ductile Iron Fittings

- (a) Flanged ductile iron fittings conforming to AWWA C110.
- (b) Fittings shall meet the following minimum criteria:
  - (i) Fittings shall be cement-mortar lined in accordance with AWWA C104.
  - (ii) Fittings to be liquid epoxy coated to AWWA C210, E10.4.8, and E10.5.4 or fusion bonded coated (interior and exterior) in accordance with AWWA C213, E10.4.9, and E10.5.4.

#### E10.4.4 Fabricated Steel Pipe and Fittings

- (a) Steel pipe and fittings shall conform to AWWA C200, AWWA C208, and meet the following requirements:
  - (i) Minimum steel yield strength of 240 MPa (35,000 psi)
  - (ii) Minimum wall thickness of 9.5 mm for all sizes.
- (b) Threaded steel nipples shall be Schedule 80 (minimum) conforming to ASTM A53.
- (c) Pipe and Fittings shall be liquid epoxy coated (interior and exterior) in accordance with AWWA C210, E10.4.8, and E10.5.4 or fusion bonded coated (interior and exterior) in accordance with AWWA C213, E10.4.9, and E10.5.4.

#### E10.4.5 Flanges for Pipe and Fittings

- (a) Steel flanges shall conform to AWWA C207, minimum Class D Flange
- (b) Threaded ductile iron flanges shall conform to AWWA C115 ASME/ANSI B16.1 Class 125.

#### E10.4.6 Pipe Couplings and Flange Adaptors

- (a) Pipe couplings shall conform to AWWA C219.
- (b) Minimum requirements for sleeve couplings are:
  - (i) Center sleeve length: 250 mm
  - (ii) Center sleeve thickness for steel couplings: 9.5 mm
  - (iii) Couplings capable of accommodating up to 2 degrees deflection
  - (iv) Design pressure 150 psi
- (c) Minimum requirements for flange adaptors:
  - (i) Flanges shall conform to AWWA C207, Class D or ASME/ANSI B16.1, Class 125.
- (d) Restraining end rings shall be supplied where axial thrust restraint is specified on the Drawings. Restraint rings shall be specifically designed for the material type of the pipes being joined.



- (e) All hardware shall be type 316 stainless steel in accordance with E10.4.1 and shall utilize di-electric insulating boots in accordance with E10.4.10.
- (f) Couplings to be fusion bonded epoxy coated in accordance with E10.4.9 and E10.5.4.
- (g) All transition couplings larger than 300 mm in diameter, with differential outside pipe diameters greater than 25 mm, shall be restrained to prevent movement of the coupling due to differential thrust forces. Tie rods placed in compression for the purpose of restraining differential thrust forces shall be no longer than 150 mm and the Contractor must demonstrate they are capable of withstanding the applied forces.

#### E10.4.7 Coatings

- (a) Unless otherwise specified herein coatings for all metal chamber piping and fittings shall be a liquid epoxy meeting the requirements of E10.4.8. As an alternative to liquid epoxy, the Contractor shall have the option to use fusion bonded epoxy in accordance with E10.4.9.
- (b) Field-applied pipe coatings for above ground piping shall be a liquid epoxy meeting the requirements of E10.4.8.

#### E10.4.8 Liquid Epoxy Coatings

- (a) Liquid epoxy coatings shall conform to AWWA C210.
- (b) Liquid epoxy coatings shall be NSF 61 certified for immersion service in feeder main and water main pipelines.
- (c) All coatings shall be applied in a minimum of two (2) or more layers (5 mils dry film thickness minimum each coat) for a minimum final coating dry film thickness of the greater of 16 mils or the thickness recommended by the manufacturer for immersion service.
- (d) Interior pipe linings shall be a 100% solids liquid epoxy product. Approved products: Enviroline 230, Bar-Rust 234P, Specialty Polymer Coatings SP-7888, or approved equal in accordance with B7.
- (e) Exterior coatings for all exposed steel, piping, valves, and actuators shall be Polyamide Epoxy. Approved products: Enviroline 230, Bar-Rust 234P, Specialty Polymer Coatings SP-7888, Tnemec Series 140F Pota-Pox Plus, Amerlock 2 or approved equal in accordance with B7.
- (f) Submit product data for interior lining and exterior coating products.

#### E10.4.9 Fusion Bonded Epoxy Coatings

- (a) Fusion bonded epoxy coatings shall conform to AWWA C213 for steel components and AWWA C116 for ductile iron fittings.
- (b) Fusion bonded epoxies shall be NSF 61 certified for immersion service in feeder main and water main pipelines.
- (c) The final minimum coating thickness shall be the greater of 10 mils or the thickness recommended by the manufacturer for immersion service.
- (d) Submit product data for interior lining and exterior coating products.

#### E10.4.10 Flange Isolation Kits

- (a) Flange isolation kits shall be used where noted, where dissimilar metal piping or fittings are joined.
- (b) Flange isolation kits shall be to City of Winnipeg specification except as modified below.
- (c) Each kit shall be double flange isolation kit with insulating sleeves and washers for each flange of the bolted connection.
- (d) Bolt sleeves shall be comprised of G10 or G11 epoxy glass.

#### E10.5 Methods

E10.5.1 Pre-Construction Valve Chamber Inspection

- (a) The Contractor shall inspect the existing components and confirm all dimensions prior to procuring components during a pre-construction chamber inspection. The Contractor shall provide all necessary traffic control and access support to facilitate the inspection.
- (b) The Contractor shall be prepared to clean components to obtain accurate measurements. The Contractor shall coordinate to have appropriate qualified representatives from material suppliers present to ensure accurate measurements are obtained to facilitate procurement of materials.
- (c) These inspections shall be completed as soon as possible following Award as to not delay material procurement and construction.

E10.5.2 All disassembled piping shall be inspected for defects after sandblasting. The Contract Administrator shall be notified of any defects affecting the long-term performance of the piping, such as cracks and pitting which may require repair prior to coating works.

E10.5.3 The feeder mains shall be securely blocked and sealed overnight and during other periods where the Contractor is not operating to prevent contamination of the existing feeder mains.

E10.5.4 Coatings

- (a) Where indicated on the Drawings and directed by the Contract Administrator, prepare metal surfaces for recoating using the following methods:
  - (i) Steel - Prepare steel surfaces for recoating by blast cleaning to near-white metal as specified by Joint Surface Preparation Standard NACE No.2/SSPC-SP10.
  - (ii) Cast and Ductile Iron - Prepare ductile iron surface in accordance with NAPF 500-03.
  - (iii) Remove all dust and loose residues from the prepared surfaces and surrounding area. The surface shall be roughened to a degree suitable for the coating system employed.
- (b) Protect valve seals, machined surfaces, threads, and nameplates from sandblasting.
- (c) Primer coat to follow immediately after completion of sandblasting and prep.
- (d) Apply liquid epoxies of prepared surfaces in accordance with AWWA C210, E10.4.8, and the manufactures recommendations.
- (e) Apply fusion bonded epoxies of prepared surfaces in accordance with AWWA C213, E10.4.9, and the manufactures recommendations.
- (f) Provide adequate ventilation and heat to facilitate curing of coatings.
- (g) Interior linings for pipes and fittings shall be applied and cured as recommended by the manufacturer prior to placing into service. Linings must be fully cured for immersion service prior to installation and reinstating the line into service. Where accelerated cure times are required for assembly and water immersion, a coating and curing plan shall be submitted to the Contract Administrator in accordance with E6 a minimum of five (5) Business Days prior to application.

E10.5.5 Bedding

- (a) All pipes shall be installed in accordance with CW2030, utilizing a Class B bedding.

E10.5.6 Assembly of Flanged Piping Systems

- (a) All flanges shall be assembled in accordance with AWWA M11 and AWWA C604.

E10.6 Measurement and Payment

E10.6.1 Pre-Construction Valve Chamber Inspection

- (a) Pre-construction chamber inspection will be measured and paid for on a lump sum basis at the Contract Unit Price for "Pre-Construction Valve Chamber Inspection" as listed in Form B: Prices.
- (b) Payment for "Pre-Construction Valve Chamber Inspection" will include payment for all labour and materials to complete the work as specified including traffic control.

#### E10.6.2 Valve Chamber Access

- (a) Feeder main valve chamber access will be measured and paid for on a lump sum basis for each chamber at the Contract Unit Price for "Valve Chamber Access" as listed in Form B: Prices.
- (b) Payment for "Valve Chamber Access" will include payment for all labour and materials to complete the work as specified including, but not limited to, site setup, shoring, excavation, backfill, and site cleanup. Payment will be made on the following payment schedule:
  - (i) fifty percent (50%) payment upon excavation of the chamber and commencement of the valve chamber rehabilitation work; and,
  - (ii) one hundred percent (100%) payment upon completion of the work, restoration, and removal of the temporary asphalt work.

#### E10.6.3 Valve Chamber Piping Rehabilitation

- (a) Removal and replacement of all chamber components will be measured and paid for on a lump sum basis for each chamber at the Contract Unit Price for "Valve Chamber Piping Rehabilitation" as listed in Form B: Prices.
- (b) Payment for "Valve Chamber Piping Rehabilitation" will include payment for all labour and materials to complete the work as specified. Included components:
  - (i) disassembly and cleaning of existing chambers to facilitate the Work;
  - (ii) removal of existing and installation of new piping components;
  - (iii) sandblasting and coating of exposed steel components;
  - (iv) reassembly of the chambers; and,
  - (v) installation of insulation and associated works.
- (c) Supply, installation and commissioning of new feeder main valves will be paid in accordance with E11.

### **E11. BUTTERFLY VALVES**

#### E11.1 Description

- (a) This Specification shall cover the design, manufacture and installation of butterfly valves. This Specification is supplementary to and shall be read together with the latest revision of AWWA Standard C504, "Rubber Seated Butterfly Valves".
- (b) All butterfly valves to be supplied under this Contract shall be designed and manufactured by a company having at least five (5) years prior experience in manufacturing these types of products in the sizes and to the pressure ratings as those specified herein.

#### E11.2 Design Requirements

- (a) General
  - (i) Design, materials and construction of all valves shall conform to the latest version of AWWA Standard C504.
  - (ii) Further to AWWA C504, products and coatings in contact with potable water shall be certified as suitable for contact with drinking water by an accredited certification organization in accordance with ANSI/NSF 61 "Drinking Water System Components – Health Effects"

- (iii) Design torques shall be calculated using procedures outlined in AWWA Manual of Water Supply Practices – Butterfly Valves: Torque, Headloss and Cavitation Analysis – M49.

(b) Design Parameters

- (i) Service Potable Drinking Water
- (ii) Chemical Resistance 1 % Hypochlorite
- (iii) Installation Submerged Service
- (iv) Flow Direction Bi-Directional
- (v) Service On-Off
- (vi) Operating service -40°C to +70°C
- (vii) Water Temperature Service 0°C to 20°C
- (viii) Normal System Operating Pressure 552 kPa (80 psi)
- (ix) Valve Test Pressure (2 times Operating) 2000 KPa (300 psi)
- (x) Type of Body (All) Flanged Short Body
- (xi) Maximum Non-Shock Shut-Off Pressure (All) 1000 Kilopascals (150 psi)
- (xii) Body (All) Cast Iron
- (xiii) Headloss Maximum K value 0.5
- (xiv) Valve torques and safety factors shall be based upon the design pressure of 700 Kilopascals (100 psi).
- (xv) Maximum Velocity 4.88 metres per second (m/s)

NOMINAL PIPE SIZE (MM)	QUANTITY	ACTUATOR TYPE	VALVE CLASS	PRIMARY SERVICE FUNCTION
600	3	Manual	150B	Isolation (Open/Close)

E11.3 Materials

(a) General

- (i) Materials for butterfly valves shall meet or exceed the latest revision requirements of AWWA Standard C504 and shall meet or exceed the requirements of this Specification.
- (ii) Materials throughout shall be the best of their respective kinds. The equipment shall be designed for the very highest class of service, shall include the highest degree of strength, durability and reliability for continuous operation and for most convenient maintenance.
- (iii) Liberal factors of safety (minimum of fifty percent (50%) shall be used throughout especially for all parts subject to alternating stresses or shock.
- (iv) All joints shall be machined and all castings shall be spot-faced for nuts. All rods shall be finished. All mating faces shall be drilled and tapped, peened, or finished as subsequently specified.
- (v) The mechanical features of the equipment covered by these Specifications shall conform to the appropriate standards of the ASME.
- (vi) Threads on all screws, bolts, studs, and nuts shall be American Standard. Tapped holes in flanges shall be standard unified national threads of the coarse-thread series.

(b) Stainless Steel Components

- (i) All components specified in the latest revision of AWWA Standard C504 as stainless steel and the valve shaft, pins, clamps and retaining rings for the rubber seats shall

be ASTM A240 or ASTM A276 Grade S30400 (Type 304) stainless steel. No alternative materials will be accepted in this regard.

- (c) Workmanship
  - (i) All foundry and machine work shall be in accordance with the best modern practice for the class of work involved.
  - (ii) All parts shall conform accurately to the required dimensions and shall be free from injurious defects. All machine parts shall be made to template or gauge.
  - (iii) No repairs to metal such as welding, plugging, peening or stitching will be permitted. Any valve or actuator exhibiting such repairs will be rejected.
  - (iv) All joints shall be faced true and shall be watertight where subject to water pressure.
  - (v) The bolt holes of all cast iron flanges and flanged fittings shall be spot faced to the specified thickness of flange with a plus tolerance of 3 millimetres (1/8 inch).
  - (vi) All iron parts receiving bronze mounting shall be finished to fit. Such hand work shall be done in finishing as is required to produce a neat, workmanlike, well fitting, and smooth operating job throughout.
  - (vii) All parts of the same size and same make shall be interchangeable.
- (d) Ferrous Castings
  - (i) All castings shall be true to pattern, of workmanlike finish and of uniform fine grain quality and condition, free from blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects and shall be smooth and well cleaned before inspection. Castings shall be readily machinable. Castings shall not be repaired, plugged, or welded.
- (e) Valve Bodies
  - (i) Valve bodies shall be short body and constructed of either cast iron conforming to ASTM Standard A126, Class B or ASTM A48, Class 40; of ductile iron conforming to ASTM A536, Grade 65-45-12; or of alloy cast iron conforming to ASTM A436, Type 1 and 2, or ASTM A439, Type D-2 with a maximum lead content of 0.003 percent.
- (f) Valve Ends
  - (i) The ends of the valves shall be flanged and drilled to ANSI B16.1 standard for cast iron flanges, Class 125.
- (g) Valve Discs
  - (i) The design and materials of valve discs shall conform to the requirements of Section 4.5 of the latest revision of AWWA Standard C504.
  - (ii) Discs shall be offset to provide an uninterrupted 360 degree seating edge and shall be cast iron per ASTM A48, Class 40 or ductile iron per ASTM A536 (65-45-12).
  - (iii) The disc seating edge, if applicable, shall be solid type 316 stainless steel.
  - (iv) The disc shall be securely attached to the valve shaft using type 304 stainless steel taper fasteners.
  - (v) Disc structures containing hollow cavities are not acceptable.
- (h) Valve Shaft
  - (i) Valve shaft shall be constructed of type 304 stainless steel.
- (i) Valve Seats
  - (i) Valve seats shall be reinforced natural or synthetic rubber reinforced with high resiliency fabric inserts. The mating seat shall be of type 304 stainless steel. Seats shall be of a design that permits adjustment, removal or replacement of the seat at the site of the installation without removal of the valve from the line. Seats that are clamped or mechanically secured are preferred over epoxy retained seats.
  - (ii) Valve seats shall be manufactured from a solid mass rather than layers of rubber bonded together.
  - (iii) Valves with a rubber seat mounted on the valve disc shall meet the following conditions:

- a) The disc seats shall be offset from the centre line of the shafts so that the rubber seat forms a continuous uninterrupted ring.
- b) An insert of stainless steel shall be provided in the body to provide a smooth seating surface for the rubber disc seat.
- (iv) Mechanically retained rubber seats shall be held in position on the disc or body by a segmented retaining ring secured by type 316 stainless steel nuts and bolts which by tightening will slightly deform the rubber seat to maintain proper contact with the seat face throughout the entire circumference.
- (j) Bearings
  - (i) Bearings in the valve body for shaft ends shall be of the sleeve type made of self-lubricating material.
  - (ii) Each valve shall be equipped with one or two thrust bearings of corrosion resistant material on the shaft, outboard of the shaft seal or in the actuator housing.
- (k) Shaft Seals
  - (i) Shaft seals shall be designed for the use of standard split-V type packing, standard O-ring seals or pull down packing as described in Section 4.5.7 of the latest revision of AWWA Standard C504.
- (l) Painting and Coating
  - (i) Interior surfaces shall be coated with a protective system in accordance to AWWA Standard C550 – Protective Interior Coatings of Valves and Hydrants, which can be used in a potable water system.
  - (ii) Coatings shall comply with ANSI/NSF 61 “Drinking Water System Components – Health Effects”
  - (iii) All coatings shall be applied in a minimum of two (2) or more layers (5 mils dry film thickness minimum each coat) for a minimum final coating dry film thickness of the greater of 16 mils or the thickness recommended by the manufacturer.
  - (iv) Coatings shall be a 100% solids liquid epoxy product. Approved products: Enviroline 230, Bar-Rust 234P, Specialty Polymer Coatings SP-7888, or approved equal in accordance with B7.
  - (v) Coatings shall be holiday free as defined in Section 5.2.3 of AWWA Standard C550.
  - (vi) Exterior surfaces shall be painted consistent with interior surfaces.
  - (vii) Surfaces shall be prepared to NACE SSPC-SP10- Near-White Metal Blast Cleaning
  - (viii) All machined surfaces shall be protected with an approved coating, prior to assembly to prevent rusting. Machined surfaces for valve seats shall have particular attention paid to, as this area if untreated, has proven to support "barnacle growth" which can prevent watertight closure of the valve.
- (m) The valve manufacturer shall confirm compatibility with supplied actuator in accordance with E12.
- (n) Acceptable Manufacturers/Products
  - (i) DeZurik
  - (ii) K-Flo 47 Series
  - (iii) Mueller
  - (iv) Pratt
  - (v) Val-Matic
  - (vi) or approved equal in accordance with B7.

#### E11.4 Submittals

- (a) Shop Drawings
  - (i) Submit Shop Drawings in accordance to E7.
  - (ii) Shop Drawings shall state all performance and design criteria.
  - (iii) Provide valve torque calculations for operating conditions listed.

- (b) Affidavit of Compliance
  - (i) Provide Affidavit of Compliance stating that valves meet requirements of the latest revision of ANSI/AWWA Standard C504 and terms of this specification.
- (c) Testing
  - (i) Provide all factory pressure test reports.
  - (ii) Provide protective coating thickness measurements as specified in ANSI/AWWA Standard C550.
  - (iii) Provide recent coating qualification testing results as specified in ANSI/AWWA Standard C550 Section 5.2.1.

#### E11.5 Valve Testing and Acceptance

##### E11.5.1 Factory Tests

###### (a) General

- (i) All acceptance testing shall be completed in the presence of the Contract Administrator or his appointed representative, unless the Contract Administrator waives this requirement. Provide a minimum of two (2) weeks notice of testing schedule to the Contract Administrator.
  - ◆ The Contract Administrator may attend the inspection remotely through a virtual platform such as Microsoft Teams or Zoom. The vendor, on request of the Contract Administrator, shall arrange for live feed streaming of the testing, and follow instruction of the Contract Administrator with respect to witnessing of testing, viewing test gauges, seats, seals and other test apparatus. Cameras used shall be capable of high definition (HD) resolution
- (ii) Testing of valves and actuators, including pressure tests, paint and coatings and electrical tests shall be coordinated to minimize number of plant visits.
- (iii) If the Contract Administrator waives witnessing of testing as indicated in E11.5.1(a)(i), provide all testing results to the Contract Administrator for review prior to shipping valves.
- (iv) All valves shall be tested with mated actuators mounted and adjusted.
- (v) All valves shall be tested with valves mounted in the vertical operating orientation.
- (vi) Testing shall be completed in accordance with the latest version of AWWA C504.
- (vii) The following information shall be supplied by the Contractor prior to delivery of the valves:
  - ◆ A certified copy of the chemical and physical analysis on all materials used in the manufacturer of the valve(s) or certification that the materials used are in strict accordance with this specification.
  - ◆ Copies of the test reports for Performance, Leakage and Hydrostatic Tests performed in accordance with AWWA Standard C504. Included in the report shall be the signature of the official who is responsible for the valve assembly and testing.

###### (b) Protective Coatings

- (i) Conduct non-destructive film thickness testing, in accordance to NACE SSPC PA 2, on both interior and exterior surfaces and provide comparison to qualification standard, as per AWWA Standard C550.
- (ii) Conduct low voltage holiday testing as specified in AWWA Standard C550 section 5.2.3. Completed coating shall be holiday-free.
- (iii) Provide results of factory testing to the Contract Administrator.

##### E11.5.2 Field Tests

###### (a) Butterfly Valves

- (i) The Contractor shall perform a hydrostatic leak test, in the presence of the Contract Administrator, on all valves once they arrive in Winnipeg at a mutually agreed upon location.
- (ii) The City will provide a suitable blind flange for testing. The blind flange will remain property of the City upon successful completion of the testing.
- (iii) The Contractor shall provide two (2) 3 mm SBR gasket, bolts, and testing equipment, suitable to conduct tests. Bolts shall be of suitable length to mount a AWWA C207 Class D blind flange.
- (iv) The test shall be performed as follows:
  - ◆ The valve shall be orientated in the vertical position.
  - ◆ A gasketed, steel blind flange with a tapped fitting suitable for introduction of compressed water shall be bolted in place.
  - ◆ The space between the blind flange and valve disc shall be filled through the center port, and air bled off through the top port. Once all air has been expelled, the top test port shall be closed.
  - ◆ A pressure of 1000 kPa for class 150B valves shall be applied through the fitting and maintained for 10 minutes. Under this pressure the valve seat shall be perfectly watertight.
  - ◆ The test shall be repeated for the opposite side.

E11.5.3 The Contractor shall ensure a qualified representative of the valve manufacturer is present for the testing of the valves to correct any deficiencies found.

## E11.6 Installation

### E11.6.1 Installation of Butterfly Valve

- (a) Install butterfly valves as shown on the Drawings. Valves shall be installed with the valve shaft in the horizontal position.
- (b) Core 125 mm opening in roof slabs directly above actuator operation nut. Valve box and valve stem extensions shall be installed plumb and aligned directly above the valve actuator operation nut.

### E11.6.2 Commissioning of Butterfly Valve

- (a) The Contractor shall assist in operation of the butterfly valve for the purpose of commissioning.

## E11.7 Measurement and Payment

- (a) Supply and installation of butterfly valves shall be measured on a unit basis for each size of valve acceptably installed. Payment shall include supply and installation of valves, gearboxes, handwheels, extension shafts and any associated materials and work required for the installation. Payment will be made at the Contract Price for "Supply and Installation of 600 mm AWWA C504 Butterfly Valves".
- (b) Payment for butterfly valves will be made on the following payment schedule:
  - (i) thirty percent (30%) payment upon delivery of valve to Winnipeg and successful testing;
  - (ii) ninety percent (90%) payment upon successful installation of the valve, and manual gear box; and,
  - (iii) one hundred percent (100%) payment upon successful testing, and commissioning of the valve.

## E12. MANUAL VALVE ACTUATORS

### E12.1 Description

- (a) This Specification shall cover the design and manufacture of manual actuators for butterfly valves to be supplied under this Contract. This Specification is supplementary to and shall



be read together with the latest revision of AWWA Standard C504, "Rubber-Seated Butterfly Valves".

#### E12.2 General Design Requirements

- (a) Quarter turn, manual geared actuators shall be of worm gear drive type designed for one person operation and for a maximum pull on the handwheel rim, at maximum torque conditions of not more than 356 Newtons (80 ft pounds).
- (b) All manual actuators to be supplied under this Contract shall be designed and manufactured by a company having at least five (5) years prior experience in manufacturing these types of products in the size and to the pressure ratings as those specified herein.

#### E12.3 Gearing and Enclosure

- (a) Actuators shall be manual geared with a ball bearing mounted worm gear drive, machine cut gear teeth, and be totally enclosed in a sealed housing sufficient to permit normal operation even when totally submerged in water. Travelling nut type of mechanisms will not be accepted. Gear lubricant shall be of the bulk grease type; synthetic lubricants will not be accepted.
- (b) Number of actuator turns to open or close the valve shall be kept to as few as possible to avoid overtorquing and damage to the actuator.
- (c) Submersible rating shall be adequate for 7.5 metres water submergence for forty-eight hours.
- (d) Accessible parts of the actuator requiring lubrication shall be provided with button-head alemite grease fittings.
- (e) Valve will be mounted with shaft in vertical position. Refer to Appendix A for general configuration.
  - (i) A bevel gear shall be provided to orientate handwheel and operating nut in the horizontal position.
  - (ii) Final orientation of the gearbox on the valve will be provided during Shop Drawing review process.

#### E12.4 Input Limit Stops

- (a) Adjustable, external stop-limiting devices shall be provided on the actuators to prevent over-travel of the valve disc in the open and closed position.
- (b) Under circumstances where spur gear attachments are installed on the input side of the actuator to facilitate the maximum input operating torque of 356 Newtons (80 ft. pounds), input limit stops shall be installed on the input side of the spur gear attachment.
- (c) A shear pin or other torque regulating device shall be provided on the actuator or handwheel/operating nut as an extra precaution against actuators being over-torqued.

#### E12.5 Handwheel

- (a) Each actuator shall be equipped with a 450 millimetre (min) to 600 millimetre (max) diameter handwheel fitted with an operating nut secured in position by a lock nut, pin or key. The operating nut shall be 49 millimetres square at the top, 51 millimetres square at the base and 45 millimetres high. The handwheel shall be made of cast iron or aluminum of the rimmed type with finger grips, an arrow, the word "OPEN" cast in relief on the rim and have an easy slide fit onto the mating shaft. Direction of opening shall be counter clockwise. Spinners shall be provided on all handwheels.
- (b) The handwheel shall be located sufficiently away from the valve flanges, housings, etc. such that personnel will not hit their knuckles on any of these obstructions when using the handwheel.

#### E12.6 Valve Position Indicator

- (a) A mechanical, valve position indicator shall be provided and mounted on the outside of each valve actuator. The dial or scale plate shall be 316 stainless steel and shall be clearly graduated and marked. A 316 stainless steel pointer shall be aligned to show the exact position of the valve disc in the valve body. The fastener for the indicator dial shall be made of 316SS stainless steel.
- (b) There shall also be a visible indication on the valve shaft end showing the position of the valve disc in relation to the shaft to ensure proper relation of the disc and indicating mechanism in the event an actuator has to be removed and replaced on a valve.

#### E12.7 Stainless Steel Extension Shaft

- (a) A 50 mm diameter stainless steel extension shaft shall be supplied with the butterfly valves for surface operation as shown on the Drawings.
- (b) The extension shaft shall be configured for a 50 mm AWWA operating nut.
- (c) The extension shaft shall be located a minimum of 150 mm and maximum of 450 mm from the proposed final grade.

#### E12.8 Protective Coatings

- (a) All external ferrous components including adaptor and mounting plates, shall be painted and tested in accordance to Clause E11.3(l) and Clause E11.5.1(b) of this Specification.
- (b) Any touch-up paintwork required during installation shall be undertaken by the installation Contractor. The touch-up paint shall be of the same colour and specifications used in the above clauses and shall be supplied by the Contractor. The Contractor shall provide a minimum of one (1) litre of paint product for this purpose.

#### E12.9 Measurement and Payment

- (a) Supply and installation of manual actuators, valve stems, and associated materials will be considered incidental to "Supply and Installation of 600 mm AWWA C504 Butterfly Valves" and will not be measured for payment. No additional payment will be made.

### **E13. CHAMBER DRAIN CLEANING AND CCTV INSPECTIONS**

#### E13.1 Description:

- (a) This Specification shall cover cleaning and CCTV inspection of chamber drains.

#### E13.2 Methods

- E13.2.1 Complete cleaning operations in accordance with CW 2140.
- E13.2.2 Complete inspections in accordance with CW 2145.
- E13.2.3 Submit the CCTV inspection video to the Contractor Administrator for review in accordance with CW 2145 and as specified herein.
- E13.2.4 Full coding required for all CCTV inspections.
- E13.2.5 The Contractor shall confirm operation of the existing backflow valve in the chamber.

#### E13.3 Amendments and Supplements to CW 2145:

- E13.3.1 Further to Section 3.13, a paper or "hard copy" of the sewer inspection reports is not required and the digital format should be submitted on a CD-R.
  - (a) The Contractor shall maintain backup copies of all digital video and inspection data submissions for the duration of the Warranty Period as stated in C13.
  - (b) The Contractor shall supply inspection data for review by the Contract Administrator on a DVD.

#### E13.4 Sewer Inspection Equipment

**E13.4.1** Notwithstanding CW 2145, CCTV equipment meet the following requirements:

- (a) Minimum requirements of the in-line inspection platform include:
  - (i) Operable in sewers of various cross-sections and constructed of standard pipe materials including brick, concrete, PVC, HDPE, and steel.
  - (ii) Tethered to facilitate extraction of the platform from the sewer, without causing damage to the sewer infrastructure, in the event the equipment fails or otherwise becomes uncontrollable within the sewer.
  - (iii) Equipped with sufficient high intensity lighting to illuminate the sewer for visual inspection.
  - (iv) Equipment shall be capable of continuously capturing digital video from first generation recordings with no frame loss, regardless of the progression of the inspection.
  - (v) Equipment shall be used to acquire continuous digital video images of the sewer for the entire length being inspected.

**E13.5** Measurement and Payment

- (a) Valve chamber drain cleaning and inspection will be measured and paid for on a lump sum basis for each chamber at the Contract Unit Price for "Valve Chamber Drain Cleaning and Inspection" as listed in Form B: Prices.
- (b) Payment for "Valve Chamber Drain Cleaning and Inspection" will include payment for all labour and materials to complete the work as specified.

**E14. WATER MAIN AND FEEDER MAIN DISINFECTION**

**E14.1** Description

**E14.1.1** This specification covers the disinfection of water mains, feeder mains, and fittings.

**E14.2** Disinfection

**E14.2.1** Disinfection of water mains and feeder mains shall be completed in accordance with CW2125 and AWWA C651.

**E14.2.2** The Contractor shall take every reasonable precaution during construction to prevent debris from entering the pipeline. If, in the opinion of the Contract Administrator, deleterious substances have entered the pipeline, the Contractor shall flush the pipeline with sanitized pipeline cleaning equipment.

**E14.2.3** All new components and equipment being used within a potable water pipeline shall be spray or swab disinfected using a 200 mg/L free chlorine solution prior to entering or coming in contact with the pipe.

**E14.2.4** The Contractor shall ensure hoses, hydrants, meters, and other appurtenances used for flushing operations are protected from freezing.

**E14.3** Health Testing

**E14.3.1** Following completion of the work and turnover of the feeder main to the City, the City will fill the line in preparation for health testing. The Contractor shall coordinate with the City and support flushing operations to facilitate health testing. Flushing operations are anticipated to include hose connections, directing water to the nearby WWS. The Contractor shall supply all materials to facilitate flushing operations, including hose ramps for crossing traffic lanes on Lagimodiere Blvd.

**E14.3.2** Water samples for health tests taken in accordance to CW 2125, except test samples shall be taken each day at least 24 hours apart for three (3) successive days.

**E14.4** Disposal of Chlorinated Water

- E14.4.1 Chlorinated water shall be treated by one of the following methods, as recommended in AWWARF – Guidance Manual For The Disposal Of Chlorinated Water:
- (a) Discharged into nearby WWS MH's if possible.
  - (b) De-chlorination of water with discharge into the LDS system. De-chlorination may be accomplished using the following:
    - (i) Sodium Ascorbate,
    - (ii) Vita-D-Chlor TM by Integra Chemical,
    - (iii) or approved equal in accordance with B7.
  - (c) Contain chlorinated water on Site until chlorine has dissipated to acceptable limits.

- E14.4.2 The Contractor shall submit a chlorinated water disposal plan in writing to the Contract Administrator a minimum of five (5) working days prior to performing any cleaning or flushing of water main or feeder mains. The disposal plan shall at a minimum include the following:
- (a) Intended means of disposal for each site
  - (b) Means of de-chlorination (if required)
  - (c) Means of storing water for discharge (if required)

- E14.4.3 The Contractor shall ensure that the selected means of disposing of chlorinated water does not result in unsafe site conditions as a result of freezing atmospheric temperatures.

#### E14.5 Measurement and Payment

##### E14.5.1 Disinfection, Health Testing, and Disposal of Chlorinated Water

- (a) Disinfection, health testing, and disposal of chlorinated water will be considered incidental to "Feeder Main Valve Chamber Piping Rehabilitation" and will not be measured for payment. No additional payment will be made.

## E15. VALVE CHAMBER STRUCTURAL REHABILITATION

### E15.1 Description

- (a) This Specification shall cover the modification and restoration of existing concrete valve chambers as shown on the Drawings.

### E15.2 Shop Drawings

- E15.2.1 Provide shop drawings in accordance with E3.

### E15.3 Materials

- E15.3.1 All materials shall conform to the requirements of this Specification and the requirements of the latest edition of the City of Winnipeg Standard Construction Specification.

#### E15.3.2 Structural Concrete

- (a) Provide concrete mixed in accordance with requirements of CW 2160 and CAN/CSA-A23.2.
- (b) Structural concrete design shall be in accordance with performance specification having the following properties:
  - (i) Class of Exposure: S-1 & F-1
  - (ii) Minimum Compressive Strength @ 28 days: 35 MPa

#### E15.3.3 Structural Steel

- (a) Structural steel for the W200X100 structural section shall be new and of the grade 350W, category 3, and shall be in accordance with CAN/CSA G40.20/G40.21.
- (b) Structural steel for the plates shall be grade 300W and conform to the requirements of CAN/CSA G40.20/G40.21.

- (c) Structural steel shall be Hot Dip galvanized. Hot-dip galvanizing shall be executed after fabrication of the element and shall be in accordance with ASTM A123 and CSA G164 and shall have a minimum mass of zinc coating of 610 g/m<sup>2</sup> (2 oz/ft<sup>2</sup>).

#### E15.3.4 Reinforcing Steel

- (a) Further to CW 2160 Sentence 2.6 Materials: Reinforcing Steel, all reinforcing steel shall conform to the requirements of CSA G30.18, Grade 400W.

#### E15.3.5 Dowel Grout

- (a) Epoxy grout shall be Hilti HIT-RE 500-V3 or equivalent as approved by the Contract Administrator. The epoxy grout shall be suitable for horizontal, vertical or overhead dowel grouting application as required.

#### E15.3.6 Bar Accessories

- (a) Bar accessories shall be of type approved by the Contract Administrator. They shall be made from a non-corroding material, and they shall not stain, blemish, or spall the concrete surface for the life of the concrete. Bar chairs are to be PVC; galvanized bar chairs are not acceptable.
- (b) Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices. Bar accessories are not shown on the Contract Drawings. The supply and installation of bar accessories shall be considered incidental to the supply and placing of reinforcing steel.

#### E15.3.7 Non Shrink Grout

- (a) Grout, if required, shall be Sika Grout 212 or CPD Non Shrink Grout or approved equal in accordance with B7, mixed and applied in accordance with the manufacturer's instructions and of a consistency suitable for the intended application, as approved by the Contract Administrator.

#### E15.3.8 Concrete Patching Repair Material

- (a) Patching repair material shall be polymer modified mortar based Sika Top 123 Plus by Sika Canada Inc., Master Emaco S 488CI by BASF Master Builders Solutions, or approved equal in accordance with B7.

#### E15.3.9 Discrete Galvanic Protection System

- (a) Galvanic anodes installed in wall patch repairs surrounding the steel beam to be Galvashield XPT anodes or approved equal in accordance with B7.
- (b) Discrete galvanic units shall be alkali-activated zinc meant to be embedded into concrete repairs and for corrosion prevention only. Nominal dimensions shall be:
  - (i) For Galvashield® XPT anodes: 100mm x 24mm x 28mm or as approved. The anodes shall be pre-manufactured with a nominal 60 grams of zinc respectively in compliance with ASTM B418 Type II cast around a pair of uncoated, non-galvanized steel tie wires and encased in a highly alkaline cementitious shell with a pH of 14 or greater.
- (c) The galvanic anodes shall be alkali-activated and shall contain no intentionally added chloride, bromide or other constituents that are corrosive to reinforcing steel as per ACT 562-13. Anode units shall be supplied with integral unspliced wires for directly tying to the reinforcing steel. Embedded galvanic anodes shall be Galvashield® XPT as shown on the Drawings, available from Vector Corrosion Technologies ([www.vector-corrosion.com](http://www.vector-corrosion.com)) USA (813) 830-7566, Canada (204) 489-9611 or approved equal.
- (d) Application for approved equals shall be requested in writing two weeks before submission of project bids. Application for galvanic anode approved equals shall include verification of the following information:
  - (i) The zinc anode is alkali-activated with an alkaline cementitious shell with a pH of 14 or greater.

- (ii) The galvanic anode shall contain no intentionally added constituents corrosive to reinforcing steel, e.g. chloride, bromide, etc.
  - (iii) The anode manufacturer shall provide documented test results from field installations showing that the anodes have achieved a minimum of 10 years in service.
  - (iv) The galvanic anode shall have been used in a minimum of ten projects of similar size and application.
  - (v) The galvanic anode units shall be supplied with solid zinc core (ASTM B418) cast around uncoated, non-galvanized, non-spliced steel tie wires for wrapping around the reinforcing steel and twisting to provide a durable steel to steel connection between the tie wire and the reinforcing steel.
  - (vi) The anode manufacturer shall provide third party product evaluation, such as from Concrete Innovations Appraisal Service, BBA, etc.
- (e) Repair mortars, concrete, and bonding agents shall be portland cement-based materials with suitable electrical resistivity less than 50,000 ohm-cm. Non-conductive repair materials such as epoxy, urethane, or magnesium phosphate shall not be permitted. Repair materials with significant polymer modification and/or silica fume content may have high resistivity. Insulating materials such as epoxy bonding agents shall not be used unless otherwise called for in the design.
- (f) Deliver, store, and handle all materials in accordance with manufacturer's instructions. Anode units shall be stored in dry conditions in the original unopened containers in a manner to avoid exposure to extremes of temperature and humidity.

E15.3.10 Foundation Waterproofing

- (a) Foundation waterproofing shall conform to CW 2160.

E15.3.11 Removable Roof Slab Sealant

- (a) Sealant for horizontal removable roof slab joints shall be a general purpose polyurethane sealant rated for buried and exterior locations and suitable for concrete.

E15.3.12 Joint Fillers

- (a) Joint Fillers
  - (i) Joint filler for concrete slab shall be self-leveling, polyurethane sealant to meet requirements of ASTM C920, Type S, Grade P, Class 25, Use T, M, A, O, and I.
  - (ii) Approved product: Vulkem 45 as manufactured by Tremco, Sikaflex 1C SL, or approved equal in accordance with B7.
- (b) Backer rod shall meet requirements of ASTM C1330.
- (c) Bond Breaker: pressure sensitive plastic tape, which will not bond to sealants.
- (d) Joint Cleaner: xylol, methylethyleketon or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

E15.3.13 Extrudable Polyurethane Sealant

- (a) Shall be non sag, polyurethane sealant
- (b) Approved Products: Sikaflex 2C NSL or approved equal in accordance with B6.

E15.3.14 Extrudable Polyurethane Waterstop

- (a) Extrudable polyurethane waterstop shall be a Gun Grade extrudable polyurethane base waterstop.
- (b) Approved Products: SikaSwell S by Sika, or approved equal in accordance with B7.

E15.4 Construction Methods

E15.4.1 Construction Method Submission

- (a) No Work shall commence on construction of valve chamber until after the Contract Administrator's review of the Contractor's Construction Method submission.
- (b) The Contractor shall prepare for the Contract Administrator's review a Construction Method submission detailing:
  - (i) Construction sequence to be followed including all methods to be employed to ensure no damage occurs to existing structures or adjacent properties within or adjacent to excavation.
  - (ii) Proposed method of construction.
  - (iii) Specialized equipment to be used.
  - (iv) Any design revisions proposed to accommodate the Contractor's proposed construction method.
  - (v) Flow control considerations including details on the Contractor's proposed method of flow control.
  - (vi) The Contractor shall respond to any concerns that may be raised by the Contract Administrator after review of the Construction Method submission.

#### E15.4.2 Hatches and Removable Slabs

- (a) Remove access hatches, covers and removable slabs where indicated on the drawings and as required for cleaning and inspection services. Replace all fasteners and bolts unless otherwise directed by the Contract Administrator.
- (b) Replace all hatches and roof panels once cleaning and inspection work is complete.
- (c) Installation of Roof Slab
  - (i) Remove all existing sealants and clean joint surfaces as per sealant manufacturer's instructions.
  - (ii) Apply sealant to horizontal surfaces in accordance with the sealant manufacturer's instructions.
  - (iii) Re-install roof slab.
  - (iv) Apply joint filler as shown on the Drawings and in accordance with the manufacturer's instructions.
  - (v) Fill all lifting hook recesses with polyurethane sealant.

#### E15.4.3 Cast-in-Place Concrete Construction

- (a) Adjust the location of the reinforcing steel adjacent to openings and in location of the waterstop along the center line of wall to frame those openings in accordance with good practice and maintain the bar spacing intent.
- (b) Do not use welded splices for reinforcing steel.
- (c) If site conditions necessitate the cutting of rebar for steel beam installation, then a new bar shall be spliced onto the old using a rebar coupler or additional dowel installed using epoxy grout adjacent to the old dowel at the direction of the Contract Administrator. If required, the rebar coupler product specification sheet shall be submitted to the Contract Administrator for approval. The coupler shall be capable of developing the rebar in tension and compression.
- (d) Install foundation waterproofing in accordance with Specification CW 2160.
- (e) The concrete roof slabs shall not have backfill placed overhead until they have reached suitable concrete strength in accordance with the design.

#### E15.4.4 Placing of Reinforcing Steel

- (a) Reinforcing steel shall be placed accurately in the positions shown on the Contract Drawings. Carefully adjust the location of reinforcing steel adjacent to openings to frame those openings in accordance with good practice and maintain the bar spacing intent.
- (b) Splices in reinforcing steel shall be made only where indicated on the Contract Drawings. Prior approval of the Contract Administrator shall be obtained where, in the

opinion of the Contractor, other splices must be made. All splices shall have laps of at least 40 bar diameters. Welded splices shall not be used.

- (c) A minimum of twenty-four (24) hours notice shall be given to the Contract Administrator prior to the pouring of any concrete to allow for inspection of reinforcing steel.

#### E15.4.5 Dowels

- (a) If required the Contractor shall core or drill holes and place dowels at the direction of the Contract Administrator. Holes for dowels shall be drilled or cored.
  - (i) The Contractor shall predetermine the locations of existing steel bars prior to drilling or coring, using an effective reinforcing steel bar locator. Dowel hole locations as shown on the Drawings, shall be relocated as required to avoid conflicts with existing reinforcing steel bars as approved by the Contract Administrator.
  - (ii) Dowel hole diameters shall be in accordance with the recommendations of the epoxy adhesive grout manufacturer.
  - (iii) All holes shall be thoroughly cleaned prior to the installation of grout and dowels.
- (b) The epoxy adhesive grout shall be prepared, placed and cured in accordance with the recommendations of the epoxy adhesive grout manufacturer.

#### E15.4.6 Concrete Patching

- (a) Provide heating and hoarding to maintain the manufacturer's minimum installation and curing substrate temperature.
- (b) Use materials in accordance with manufacturer's printed instructions, and as specified.
- (c) Remove delaminated, loose, and spalled concrete using lightweight mechanical chipping hammers or other suitable means to sound concrete. Protect reinforcing bars during removal.
- (d) Thoroughly clean all surfaces previously chipped of any loose concrete and/or laitance and prepare surface for patching in accordance with printed instructions from the manufacturer of the patching mortar. Use pressure washing to clean and prepare concrete surfaces. Do not damage the structures.
- (e) Apply material to concrete substrate in accordance with the manufacturer's printed instructions.
- (f) The patch repair and non-shrink grout shall be finished to match the profile of the surrounding concrete.
- (g) Wet cure patch repairs and non-shrink grout in accordance with the manufacturer's printed instructions.

#### E15.4.7 Discrete Galvanic Protection System

- (a) The galvanic corrosion protection shall consist of the anodes as indicated on the Drawings. The anode units are connected to the reinforcing steel and encased in a concrete with a minimum of 50 mm of clear concrete cover over the anode units.
- (b) Clean exposed reinforcing steel of rust, mortar, epoxy coating, etc. to provide sufficient electrical connection and mechanical bond.
- (c) If significant reduction in the cross section of the reinforcing steel has occurred, replace or install supplemental reinforcement as directed by the Contract Administrator.
- (d) Secure loose reinforcing steel by tying tightly to other bars with steel tie wire.
- (e) Create a clean, sound substrate by removing bond-inhibiting materials from the concrete substrate by high pressure water blasting or abrasive blasting.



- (f) Install anode units and repair material immediately following preparation and cleaning of the steel reinforcement.
- (g) Anode spacing shall be such to provide full protection for the entire patch perimeter. Anode spacing is dependent on the reinforcing steel density. Maximum anode spacing shall be as per the manufacturer's guidelines to provide a 50 years service life.
- (h) Place the galvanic anodes as close as possible to the patch edge while still providing sufficient clearance between anodes and substrate to allow the repair material to fully encase the anode with a minimum concrete or mortar cover over the anode of 25mm. If necessary, increase the size of the repair cavity to accommodate the anodes.
  - (i) Place the anode such that the preformed BarFit™ groove fits along a single bar or at the intersection between two bars and secure to each clean bar.
  - (ii) If less than 25 mm of concrete cover is expected, place anode beneath the bar and secure to clean reinforcing steel.
- (i) The tie wires shall be wrapped around the cleaned reinforcing steel at least one full turn in opposite directions and then twisted tight to create a secure electrical connection and allow no anode movement during concrete placement.
- (j) Repair materials with resistivity greater than 50,000 ohm-cm are not to be used.
- (k) Electrical Continuity
  - (i) Confirm electrical connection between anode tie wire and reinforcing steel by measuring DC resistance (ohm  $\Omega$ ) or DC potential (mV) with a multi-meter.
  - (ii) Electrical connection is acceptable if the DC resistance measured with the multi-meter is 1  $\Omega$  or less or the DC potential is 1 mV or less.
  - (iii) Confirm electrical continuity of the exposed reinforcing steel within the repair area. If necessary, electrical continuity shall be established by tying discontinuous steel to continuous steel using steel tie wire.
  - (iv) Electrical continuity between test areas is acceptable if the DC resistance measured with multi-meter is 1  $\Omega$  or less or the potential is 1 mV or less.
- (l) The discrete galvanic anodes will be connected to the existing, exposed reinforcement. Provide electrical continuity with new dowels embedded into existing concrete as per Manufacturer's guidelines to provide a 50-year design life. Proposed electrical connection details shall be approved by the anode manufacturer and shall be detailed on the shop drawing submittal. Anodes do not need to be connected to corrosion resistant reinforcement (e.g. stainless steel reinforcement).

#### E15.4.8

#### Structural Steel

##### (a) General

- (i) Except as otherwise specified herein, steelwork shall be fabricated in accordance with the latest A.W.S. Specification D1.1 and subsequent revisions.
- (ii) The workmanship shall meet established practice in modern shops. Special emphasis shall be placed in prevention of cracks, notch-like flaws and bruises that may lower the structure's resistance to fatigue and brittle fracture.
- (iii) The punching of identification marks on members will not be allowed unless authorized in writing by the Contract Administrator.
- (iv) If damage occurs to the structural steel during fabrication, the Contract Administrator shall be notified immediately. The Contractor shall submit remedial method statement. Remedial repair measures are subject to the approval of the Contract Administrator.
- (v) Dimensions and fabrication that control field matching of parts shall receive careful attention in order to avoid field adjustments.
- (vi) Steel shapes and plates shall be cut and fabricated so that the direction of the applied stress shall be parallel to the direction of plate rolling.
- (vii) Oxygen cutting shall be in accordance with AWS D1.5 and CSA W59.

- (viii) All holes for connections of pier beams and diaphragms shall be drilled or sub-punched and reamed using steel templates. Templates shall be located with utmost care as to position and angle and firmly bolted in place.
- (b) Procedures and Tolerances
- (i) Shearing of plates shall only be permitted on edges of secondary material which will be welded; all edges of primary material must be machine flame cut or, if sheared, must be planed to a depth of  $\frac{1}{4}$ " (6 mm).
  - (ii) All holes must be drilled from the solid or sub-punched a maximum  $1\frac{1}{16}$ " (18 mm) diameter and reamed.
  - (iii) Bottom flanges of girders over bearings shall be true and square. Maximum measured deviation at outside edge of bearing plates shall not exceed  $\frac{1}{25}$ " (1 mm).
  - (iv) Deviations from straightness of main girders shall not exceed  $\frac{1}{8}$ " (3 mm).
  - (v) All miscellaneous steel pieces should be bundled and clearly marked as called for on the identification of pieces drawing
- (c) Finish
- (i) All portions of the Work shall be neatly finished. Shearing, cutting, chipping and machining shall be done neatly and accurately. Finished members shall be true to line and free from twists, bends, open joints, and sharp corners and edges.
- (d) Hot-Dip Galvanizing
- (i) Shop Applied:
    - the galvanizing shall be shop applied and strictly in accordance with ASTM A123 and CSA Standard G164 to a minimum net retention of 610 g/m<sup>2</sup>;
    - submit an original and three (3) copies of the coating applicator's notarized Certificate of Compliance that the hot-dip galvanized coating meets or exceeds the specified requirements;
    - submit a hot-dip galvanizing plan for the steel girder galvanizing outlining the process, methods, responsibilities and all things necessary to avoid steel embrittlement in accordance with ASTM A143/ A143M. The Plan shall identify the methods the fabricator and galvanizer shall undertake to avoid the occurrence of strain-age embrittlement. The Plan shall also include a communication plan between the fabricator and galvanizer throughout fabrication and galvanizing process to ensure best practices are used throughout to minimize the possibility of strain-age embrittlement;
    - handle all articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion;
    - the surface finish shall be continuous, adherent, as smooth and evenly distributed as possible, and free from any defect detrimental to the stated end use of the coated article;
    - coating adhesion shall withstand normal handling consistent with the nature and thickness of the coating and normal use of the article; and,
    - furthermore, no underlying cracking and other visible damage or deterioration of the hot-dip galvanizing as a result of handling or bending operations, or any other cause, shall be galvanized-coated with field applied galvanizing touch-up material as specified hereinafter.
  - (ii) Field Applied Touch-up Galvanizing
    - Any areas of damaged galvanizing shall receive field applied touch-up galvanizing.
    - Surfaces to receive touch-up galvanizing shall be cleaned using a wire brush, a light grinding action, or mild blasting to remove loose scale, rust, paint, grease, dirt, or other contaminants.
    - For self-fluxing, low temperature, zinc based alloy rods, preheat the surface to 315°C and wire brush the surface during preheating. Rub the cleaned preheated area with the repair stick to deposit an evenly distributed layer of zinc alloy. Spread the alloy with a wire brush, spatula,

or similar tool. Field applied galvanizing shall be blended into existing galvanizing of surrounding surfaces. Care shall be taken to not overheat surfaces beyond 400°C and to not apply direct flame to the alloy rods.

- For pure zinc paint on systems, the approved product Zinga shall be applied by either a brush or roller. The Zinga shall be applied in 3 coats, with each coat having a dry film thickness of 60 µm (2.36 mils). Each coat shall be left to dry for a minimum of one (1) hour before the application of the next coat.
- The maximum area to be repaired in the field on a single repair shall be 5,000 mm<sup>2</sup>. Any damaged article with a damaged area greater shall be rejected, removed, and replaced at the Contractor's expense.

(iii) Surface Preparation and Cleaning

- Surface preparation and cleaning of materials prior to hot-dip galvanizing shall be in accordance with ASTM A123, CSA G164 and SSPC Specification SP:10, "Near White Metal Blast Cleaning", unless otherwise specified herein. The Contractor shall ensure that all exterior surfaces of structural steel are blast cleaned prior to pickling to achieve the minimum zinc coating mass of 610 g/m<sup>2</sup>. All welding and provision of holes is to be completed prior to surface preparation and cleaning, except where shown on the Drawings.
- All metal surfaces to be galvanized shall be cleaned thoroughly of rust, rust scale, mill scale, dirt, paint and other foreign material by commercial sand, grit or shop blasting or pickling prior to galvanizing. Heavy deposits of oil and grease shall be removed with solvents prior to blasting or pickling.
- The sandblasting and cleaning of structural steel members shall be done in the shop.

E15.5 Measurement and Payment

E15.5.1 Valve Pit 139 Structural Rehabilitation

- (a) Valve Pit 139 structural Rehabilitation will be measured and paid for on a lump sum basis at the Contract Unit Price for "Valve Pit 139 Structural Rehabilitation" as listed in Form B: Prices.
- (b) Payment for "Valve Pit 139 Structural Rehabilitation" will include payment for all labour and materials to complete the work as specified. Included components:
  - (i) replacement of the roof support beam and associated works; and,
  - (ii) construction of new roof slabs.

E15.5.2 Provisional – Concrete Patching

- (a) Provisional concrete patching will be measured and paid for on a square meter basis at the Contract Unit Price for "Misc. Concrete Patching" as listed in Form B: Prices in locations where patching is required outside of the work specified on the drawings as identified by the Contract Administrator.
- (b) Payment for "Misc. Concrete Patching" will include payment for all labour and materials to complete the work as specified.

**E16. CHAMBER INSULATION**

E16.1 Submittals: Submit Manufacturer's data sheets in accordance with E6.

E16.2 Materials

- (a) 50 mm thick rigid insulation CAN/ULC-S701, Type 4 rigid, closed cell type, with integral high density skin, extruded polystyrene insulation, 610 mm wide x 2440 mm long, edge treatment: butt edge and ship lapped. As manufactured by Dow Chemical, Celfort, or approved equal in accordance with B7.
- (b) Spray Foam Insulation

- (i) Spray Foam Insulation: closed-cell foam with water-resistant outer skin when cured, Great Stuff as manufactured by Dow Chemical or approved equal in accordance with B7.
- (c) Spray Applied Polyurethane Insulation
  - (i) Polyurethane foam shall be closed cell, less than 1% open cell content to ASTM D-6226.
  - (ii) Approved Products: BASF Walltite CM01 or approved equal in accordance with B7

#### E16.3 Construction Method

- (a) Verify insulation boards are unbroken, free of damage, with face membrane undamaged.
- (b) Butt edges and ends tight to adjacent board and protrusions.
- (c) Ensure Rigid Insulation panels are tight to the substrate. No void is allowed between the Rigid Insulation panel and the substrate. Cut Rigid Insulation panels to suit substrate profile.
- (d) Secure the Rigid Insulation to the substrate utilizing the Rigid Insulation Manufacturer's recommended wall adhesive for wet substrates or other approved securement methods that will not deteriorate under wet conditions.
- (e) Spray foam any voids between rigid insulation sheet joints, around manhole chimneys, and valve boxes.
- (f) Spray Applied Polyurethane Insulation
  - (i) Spray applied polyurethane insulation shall be applied to the exterior of the manhole chamber as shown on the drawings.
  - (ii) Insulation shall be applied as per the manufacturers recommendations.

#### E16.4 Measurement and Payment

- (a) Supply and installation of rigid insulation will be considered incidental to "Feeder Main Valve Chamber Piping Rehabilitation" and will not be measured for payment. No separate payment will be made.

### **E17. PROVISIONAL – CRACK INJECTION**

#### E17.1 Description

- (a) This Specification shall cover all operations relating to the epoxy injection of concrete cracks as directed by the Contract Administrator.

#### E17.2 Scope of Work

- (a) The Work under this Specification shall include surface preparation and epoxy injection of concrete cracks located on the bridge pier shaft surfaces, as shown on the Drawings and as identified by the Contract Administrator.

#### E17.3 Submittals

- (a) A list of the materials to be used for crack preparation and repair, including the following minimum information:
  - (i) Material specifications.
  - (ii) Product data sheets with test data.
  - (iii) Material safety data sheets.
  - (iv) Pot life of the components to be used based on a sample size of 200 ml at 5°C and 20°C.
- (b) A list of the equipment and accessories to be used including the following minimum information:
  - (i) The operating pressure of each component.

- (ii) The type of injection port and means of closure.

#### E17.4 Materials

##### E17.4.1 Epoxy Resin

- (a) Material used for crack injection shall be epoxy resins for passive cracks.
- (b) Epoxy grout shall prevent the penetration of water and shall have sufficient flowability to fill the crack at least 80% of the depth of the crack using the proposed equipment and method of repair at the ambient and substrate temperatures existing at the time of grouting.
- (c) Epoxy resin shall be moisture insensitive and 100% solids.

##### E17.4.2 Equipment

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

##### E17.4.3 Gauges

- (a) In addition to the calibrated gauges required for use with the pumps and with the injection hose, additional gauges shall be available on site to replace those that malfunction.

##### E17.4.4 Pumps

- (a) Equipment used for pressure injection shall be suitable for the intended use and compatible with the grout.
- (b) Pumps shall be positive displacement type and shall be capable of delivering a minimum of two litres of grout per minute.
- (c) Pumps shall be capable of developing a maximum regulated operating pressure at least equal to twice the effective pressure.
- (d) Pumps shall be equipped with a calibrated gauge and shall be capable of accurately maintaining an effective operating pressure of 50 kPa or less.
- (e) Plural component pumps shall be used when multicomponent solution grouts are used.
- (f) Hand cartridge pumps shall not be used unless the volume of crack repair is less than one litre of resin for 100 m<sup>2</sup> of gross repair area.

##### E17.4.5 Static In-Line Mixers

- (a) Static in-line mixers shall produce a homogeneous grout and shall be sized to accommodate the minimum and maximum anticipated flow rates.
- (b) Static mixers shall have the manufacturer's plate attached showing the following mixer information:
  - (i) Size.
  - (ii) Type.
  - (iii) Maximum operating pressure.

##### E17.4.6 Agitating Mixer

- (a) Agitating mixers shall have a power driven paddle mixing head and produce a homogeneous component. The speed of the mixers shall be variable to a maximum of 500 rpm.

##### E17.4.7 Injection Hoses

- (a) Injection hoses shall have a rated working pressure equal to or greater than the maximum pump operating pressure and shall be equipped with a calibrated gauge at the injection port end.

##### E17.4.8 Injection Ports

- (a) Injection ports shall be removable or non-metallic insert type units. The pressure capacity of the injection ports shall be at least equal to the maximum operating pressure of the pump. All injection ports shall be equipped with a shut-off valve or other mechanical means of closure under pressure.
- (b) Surface mounted injection ports shall not be used.

E17.4.9 Air Compressor

- (a) Compressed air shall be free from oil and water when tested according to ASTM D 4285.

E17.4.10 Drills

- (a) Drilling of the injection holes shall be performed using a rotary percussion or rotary diamond type drill.
- (b) Percussion drilling equipment shall not be used for drilling holes greater than 26 mm diameter and holes within 150 mm of any edge of concrete.
- (c) Only holes 26 mm or less in diameter shall be drilled within 50 mm of any free edge of concrete.

E17.4.11 Concrete Router

- (a) Hand-held grinding wheel or a multi-bladed cut-off saw equipped with abrasive or diamond blades.
- (b) Multi-bladed floor saw cutting equipment equipped with diamond blades.

E17.5 Construction Methods

E17.5.1 General

- (a) Installation of all accessories and material shall be according to the manufacturer's recommendations and as specified in the submitted work plan.
- (b) Work shall only proceed when the temperature of the concrete is 5 °C or greater.
- (c) Prior to commencement of the work, the cracks requiring repair, as identified by the Contract Administrator, shall be numbered, physically marked as to their extent, and measured in the presence of the Contract Administrator.
- (d) This information shall be recorded and a copy submitted to the Contract Administrator.

E17.5.2 Crack Injection

- (a) Drilling for Injection Ports
  - (i) Injection holes shall be drilled, on each side of the crack, at a 45° angle to the surface of the concrete. The holes shall be located such that they intersect the crack section at approximately the midpoint and they shall extend through the crack section. The holes shall be sized to accommodate the injection ports. The spacing of the holes shall not exceed the depth of the crack or 200 mm, and the holes shall be alternated from one side of the crack to the other.
  - (ii) Prior to installation of the injection ports each hole shall be individually cleaned of all deleterious material by an air-water blast to completely remove all drill cuttings from the hole.
  - (iii) Injection ports shall be inserted into the holes and sealed. The inserted end of the injection port shall not extend beyond the point at which the drilled hole intersects the crack.
- (b) Cleaning and Flushing
  - (i) After the injection ports have been inserted, cracks shall be flushed with an air-water mixture or an alternating water and air flush to remove all deleterious material prior to the injection of grout. The flushing material shall be injected through the injection port and continued until it exudes from the adjacent injection port and the crack is thoroughly cleaned. This flushing shall proceed from one end of the crack to the other.

(ii) A final flush shall be made with air only to remove all of the free water.

(c) Surface Preparation and Sealing

(i) Surface opening of the cracks shall be sealed prior to injection.

(ii) The surface of the concrete shall be mechanically cleaned for a distance of 25 mm each side of the crack sections to prepare a clean substrate for bonding of the surface sealing compound. The surface preparation and sealing shall be as recommended by the manufacturer of the surface sealing material.

(iii) The surface sealing material shall completely confine the injection grout to the crack section with only the injection ports providing access. The surface sealing material shall withstand the maximum injection pressure without developing leakage along the crack section.

(iv) Surface sealing of passive cracks shall not commence until at least one hour after the final air flush.

E17.5.3 Injection of Epoxy

(a) Injection of epoxy shall proceed from the injection port at the lowest elevation of the crack and continue upwards along the crack on an injection port to injection port basis without interruption to the other end of the crack. The injection nozzle shall not be moved to the adjacent injection port until epoxy is showing at the next higher adjacent injection port or refusal criteria is developed.

(b) While under pressure, each injection port shall be sealed immediately after completion of injection at that injection port.

(c) When a maximum operating pressure greater than 3 MPa is required to inject the epoxy, the injection operation shall cease until the Contractor determines why this operating pressure is required.

E17.5.4 Effective Pressure

(a) When calculating the effective pressure, the head losses shall be determined prior to commencement of injection.

(b) Head losses shall be determined in the presence of the Contract Administrator by performing a pressure flow test, through the equipment, for each equipment configuration used.

E17.5.5 Surface Finishing

(a) Surface finishing shall not proceed until the curing period, as specified by the material supplier, has elapsed. Surface finishing shall consist of removal of the injection ports and the surface sealant flush with the original concrete surface. Core holes and holes left after the removal of injection ports shall be filled with a cement-based non-shrink grout after the surface sealant has been removed.

(b) Where the crack is not completely filled to the injection surface, the crack shall be filled with a compatible material acceptable to the Contract Administrator. The material shall be applied according to the manufacturer's recommendations.

E17.6 Measurement and Payment

(a) Crack injection will be measured and paid for on a linear meter basis at the Contract Unit Price for "Misc. Crack Injection - Epoxy" as listed in Form B: Prices in locations where crack injection is required as identified by the Contract Administrator.

(b) Payment for "Misc. Crack Injection - Epoxy" will include payment for all labour and materials to complete the work as specified.

**E18. PROVISIONAL WORKS**

E18.1 Description

- (a) This Specification shall cover provisional valve chamber works.

## E18.2 Materials

### E18.2.1 PVC Backwater Valves and Piping

- (a) PVC pipe and fittings shall conform to CSA B182.1 and B182.2.
- (b) Drain piping shall utilize a solvent weld joint type.
- (c) Piping conforming to CSA 182.2 shall have a dimension ratio of 35.
- (d) The backwater valve shall utilize an EPDM seat rated to 275 kPa of back pressure.
- (e) The backwater valve shall conform to ASME A112.14.1

### E18.2.2 Precast Manhole Components

- (a) All precast manhole components shall meet the requirements of CW 2130.

## E18.3 Methods

### E18.3.1 External Point Repairs

- (a) Complete external point repairs in accordance with CW 2130.
- (b) Complete a post-repair inspection in accordance with E13.

### E18.3.2 Chamber Backflow Valve Replacement

- (a) Carefully remove existing concrete as required to expose the existing drain piping.
- (b) Install a new backflow valve, p-trap, and associated piping as required to fit the existing space.
- (c) Repair concrete floor utilizing approved products in accordance with E15. Repair area to be cut square with a minimum repair depth of 12 mm at edges. Slope floor to new drain location to the degree possible within the repair area.

### E18.3.3 Replacement of Precast MH Components

- (a) The Contractor shall install all precast manhole components in accordance with CW 2130.

## E18.4 Measurement and Payment

### E18.4.1 Provisional - External Point Repairs

- (a) Construction of external point repairs will be measured and paid in accordance with CW 2130, except as modified herein.
- (b) Maximum length of repair to be paid shall be the total length of repair verified by the CCTV inspection and accepted by the Contract Administrator.
- (c) Payment shall be at the Contract Unit Rate(s) for each scheduled repair as identified on Form B. Payment shall include all labour, equipment, and materials required to complete the work, including excavation, pipe repair, backfill, post-repair CCTV inspection, and surface restoration.
  - (i) 80% payment will be made upon completion of the external point repairs , backfill, and temporary site restoration.
  - (ii) 100% payment will be made upon acceptance of the external point repairs after submission and review of the post-repair CCTV inspection.

### E18.4.2 Provisional – Manhole Components

- (a) The supply of replacement of existing manhole components will be measured and paid for on a unit basis for the component supplied at the applicable unit price in Form B. Payment for replacement manhole components shall include supply to site only, except where noted in Form B.



- (b) Number of units to be paid for will be the total number of components supplied and/or installed in accordance with this specification, accepted and measured by the Contract Administrator.

**E18.4.3** Provisional – Replace Valve Chamber Backflow Valve Assembly

- (a) Replacement of the valve chamber backflow valve assembly will be measured and paid for on a unit basis at the Contract Unit Price for “Replace Valve Chamber Backflow Valve Assembly” as listed in Form B: Prices.
- (b) Payment for “Replace Valve Chamber Backflow Valve Assembly” will include payment for all labour and materials to complete the work as specified.

**E19. TEMPORARY SURFACE RESTORATION**

**E19.1** Description

- E19.1.1** This Specification shall cover the temporary restoration roadways and boulevards. Temporary restoration is required to facilitate construction staging and where atmospheric conditions do not permit permanent restoration upon completion of the work. Temporary restoration shall be completed as specified herein.

**E19.2** General

- E19.2.1** The Contractor is responsible for maintaining the roadway in an acceptable condition for traffic at all times while the Site is under the control of the Contractor. Temporary restoration of the roadway to permit traffic between completion of the work and permanent restoration shall be done in such a manner as to allow normal vehicle traffic. The Contractor shall be responsible for all maintenance of said restoration works.
- E19.2.2** In all cases, boulevards and roadways must be made safe for vehicles and pedestrians whenever the Contractor is not actively working on site.

**E19.3** Construction Methods

- E19.3.1** Further to Clause 3.3 of CW 1130, the Contractor shall temporarily restore surfaces to the following minimum standards:
  - (a) Backfill and level boulevards and grassed areas to match existing surface elevations.
  - (b) Cap excavations in street pavement with 100 mm thick layer of “Concrete for Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310.
  - (c) Cap excavations in sidewalk pavement with a 50 mm thick layer of “Concrete for Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310 or 50 mm of asphalt paving in accordance with CW 3410.
  - (d) Where curb has been removed as part of the pavement cut, pour temporary curb using “Concrete for Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310.
- E19.3.2** Insulate temporary concrete where required during 24 hour curing period.
- E19.3.3** Remove all temporary pavements prior to permanent restorations.
- E19.3.4** The Contractor shall monitor and maintain temporarily restored surfaces as required until permanent restoration is complete.
- E19.3.5** If, in the opinion of the Contract Administrator, temporarily restored surfaces are not being adequately maintained or were not properly constructed and pose a danger to the public, maintenance or reconstruction will be done by the City forces with no advance notification the Contractor. All costs associated with the maintenance or reconstruction of temporary pavement incurred by the City shall be deducted from future payments to the Contractor.

**E19.4** Measurement and Payment

E19.4.1 Completion of all temporary restoration shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

**E20. PERMANENT RESTORATION**

E20.1 Description

E20.1.1 This Specification covers all permanent restoration of roadways, boulevards and sidewalks.

E20.2 Construction Methods

E20.2.1 The Contractor shall follow the City of Winnipeg Street By-law No. 1481/77 and current revision of the City of Winnipeg “Street Cuts Manual” found at <https://winnipeg.ca/publicworks/permitsApprovals/pdf/Street-Cuts-Manual.pdf> and for all pavement restoration unless otherwise shown on the drawing or specifications or as directed by the Contract Administrator.

E20.2.2 All street segments within the work area impacted by the Work shall be maintained and restored with the following additional requirements:

- (a) Review and record the condition of each street segment with the Contract Administrator and a City Representative from Public Works prior to the initiation of the work. The surface restoration required for each street segment will be agreed upon at this time.

E20.2.3 The street material and condition within the project work area are classified as follows:

Street	Block	Pavement Type	Condition
Lagimodiere Blvd	Fermor Ave to E. Mint Place	Asphalt over Concrete	Good

E20.3 Permanent pavement restoration shall be in accordance with the City of Winnipeg Street Cuts Manual (2022) for each applicable pavement type.

- (a) Construct partial slab patches in accordance with CW 3230.
- (b) Construct miscellaneous concrete slab renewals in accordance with CW 3235.
- (c) Construct concrete curb renewal in accordance with CW 3240.
- (d) Construct asphaltic concrete patches (Type 1A) in accordance with CW 3240. Notwithstanding CW 3410, there will be no maximum width for an asphalt patch.

E20.4 Boulevard and median restoration

- (a) Sod all grassed areas in accordance with CW3510.

E20.5 Measurement and Payment

E20.5.1 Partial Slab Patches

- (a) Partial Slab Patches shall be measured on an area basis and paid for at the Contract Unit Price per square meter for “Partial Slab Patches - 200 mm” at the applicable thickness, as identified in Form B. Payment shall include all materials and labour required to complete the work as specified.
- (b) All cost incurred for sub base and base course materials shall be included in the unit price for “Partial Slab Patches – 200 mm”.
- (c) Payment for Partial Slab Patches will only be considered for areas directly affected by water main installation works within the project limits. Any necessary restorations that fall outside of the immediate project area may not be considered for payment, at the discretion of the Contract Administrator.

- (d) No separate measurement or payment will be made for Drilled Dowels or Tie Bars, the cost for which shall be included in the prices bid for Partial Slab Patches.

#### E20.5.2 Concrete Curb Renewals

- (a) Concrete curb renewal shall be measured on a linear meter basis and paid for at the Contract Unit Price per linear meter for "Concrete Curb Renewal - Barrier Curb (SD-204)" for the specified curb type, as identified in Form B. Payment shall include all materials and labour required to complete the work as specified.
- (b) All cost incurred for sub base and base course materials shall be included in the unit price for "Concrete Curb Renewal - Barrier Curb (SD-204)".
- (c) Payment for Concrete Curb Renewals will only be considered for areas directly affected by water main installation works within the project limits. Any necessary restorations that fall outside of the immediate project area may not be considered for payment, at the discretion of the Contract Administrator.

#### E20.5.3 Asphaltic Concrete Patches Type 1A

- (a) Construction of Asphaltic Concrete Patches shall be measured on an area basis and paid for at the Contract Unit Price per square meter for "Construction of Asphaltic Concrete Patches – Type A1". Payment shall include all materials and labour required to complete the work as specified.
- (b) Payment for Construction of Asphaltic Concrete Patches will only be considered for areas directly affected by water main installation works within the project limits. Any necessary restorations that fall outside of the immediate project area may not be considered for payment, at the discretion of the Contract Administrator.

#### E20.5.4 Sodding

- (a) Supply and installation of sod using imported topsoil shall be measured and paid in accordance with CW 3510.

## PART F - SECURITY CLEARANCE

### F1. SECURITY CLEARANCE

- F1.1 Each individual proposed to perform the following portions of the Work:
- (a) any Work on private property;
  - (b) any Work within City facilities other than:
    - (i) an underground structure such as a manhole;
    - (ii) in areas and at times normally open to the public;
  - (c) communicating with residents and homeowners in person or by telephone;
- F1.1.1 Each Individual shall be required to obtain a Police Information Check from the police service having jurisdiction at their place of residence. Or
- (a) Sterling BackCheck – for existing account holders, log into your account to send individual invitations to employees requiring security clearance. For those that do not have an account, click on the following link to open an account: <https://forms.sterlingbackcheck.com/partners/platform2-en.php?&partner=winnipegcity>; or
  - (b) Commissionaires (Manitoba Division), forms to be completed can be found on the website at: <https://www.commissionaires.ca/en/manitoba/home>; or .
  - (c) FASTCHECK Criminal Record & Fingerprint Specialists, forms to be completed can be found on the website at: <https://myfastcheck.com>
- F1.1.2 The original Police Information Check (Form P–612) will be provided by the Winnipeg Police Service to the individual applicant. The original has a validation sticker from the Winnipeg Police Service in the top right hand corner. The applicant shall:
- (a) Provide the original Police Information Check (Form P–612) to the Contract Administrator.
- F1.2 Prior to the award of Contact, and during the term of the Contract if additional or replacement individuals are proposed to perform Work, the Contractor shall supply the Contract Administrator with a Police Information Check obtained not earlier than one (1) year prior to the Submission Deadline, or a certified true copy thereof, for each individual proposed to perform such Work.
- F1.3 Any individual for whom a Police Information Check is not provided, or for whom a Police Information Check indicates any convictions or pending charges related to property offences or crimes against another person will not be permitted to perform any Work specified in F1.1.
- F1.4 Any Police Information Check obtained thereby will be deemed valid for the duration of the Contract subject to a repeated records search as hereinafter specified.
- F1.5 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at their sole discretion and acting reasonably, require an updated Police Information Check. Any individual who fails to provide a satisfactory Police Information Check as a result of a repeated Police Information Check will not be permitted to continue to perform any Work specified in F1.1.